NAVSHIPS 92358(A)
TO 16-30FRT15-25

INSTRUCTION BOOK
for
RADIO TRANSMITTING SET
AN/FRT-15B

Manufactured by

Subcontractor
BROADWAY ELECTRONICS
A Division of Broadway Maintenance Corp.
22-09 BRIDGE PLAZA NORTH
LONG ISLAND CITY 1, NEW YORK

ELECTRONIC MEASUREMENTS COMPANY, INC.
LEWIS STREET AND MAPLE AVENUE
EATONTOWN, NEW JERSEY

BUREAU OF SHIPS NAVY DEPARTMENT

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Contract NObsr-49252 *Approved by BuShips: 11 Oct 1954*

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Title page	Original	4-0 to 4-20	Original
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1-0 to 1-9	Original	7-0 to 7-100	Original
2-0 to 2-39	Original	8-1 to 8-155	Original
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DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
Code 993-100
11 October 1954

From: Chief, Bureau of Ships
To: All Activities Concerned with the Installation, Operation and Maintenance of the Subject Equipment

Subj: Instruction Book for Radio Transmitting Set AN/FRT-15B, NAVSHIPS 92358(A)

1. This is the instruction book for the subject equipment and is in effect upon receipt, superseding NAVSHIPS 92358.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense Publications.

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W. D. Leggett, Jr.
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

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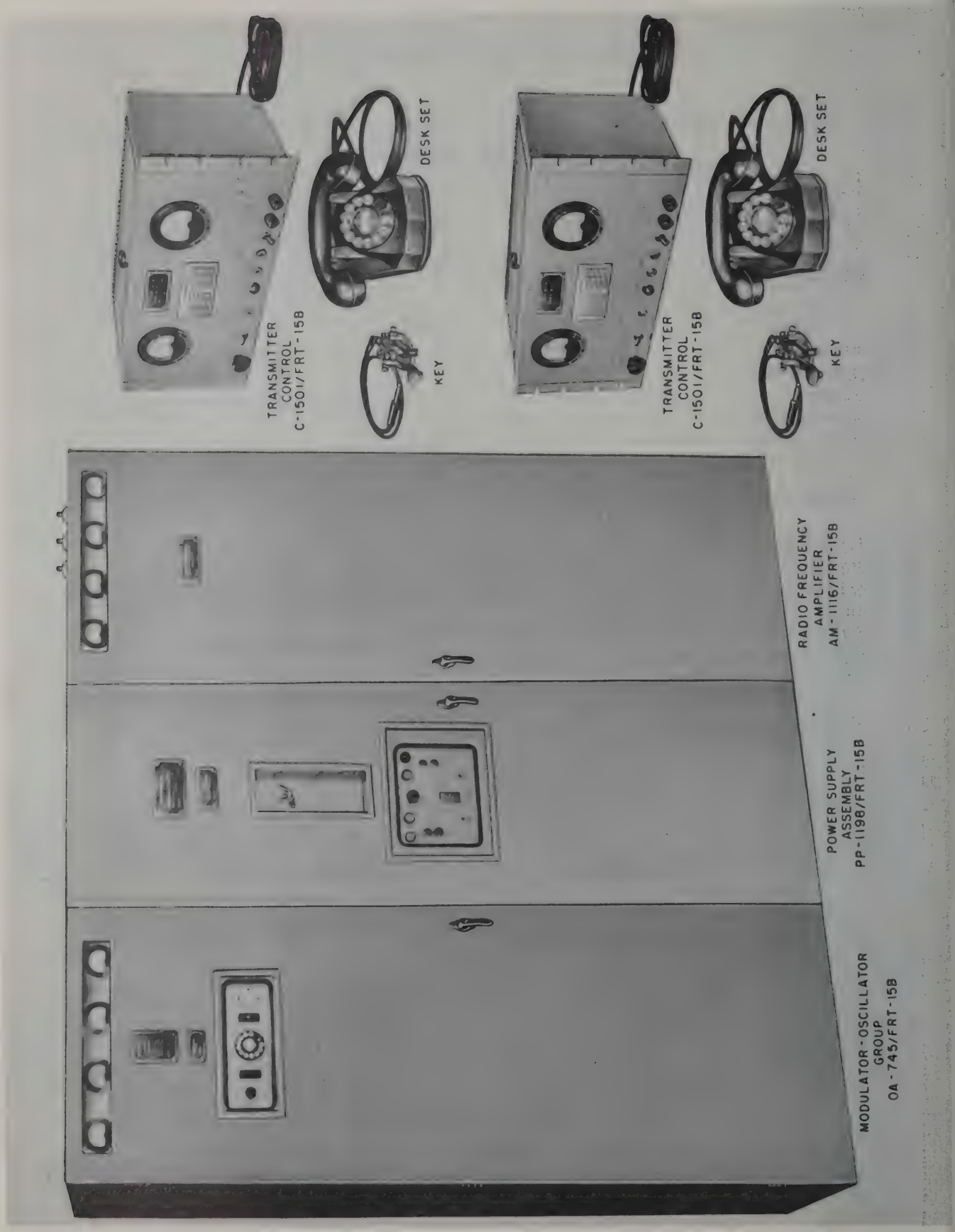


Figure 1-1. Radio Transmitting Set AN/FRT-15B

SECTION 1

GENERAL DESCRIPTION

1. SCOPE OF INSTRUCTION BOOK.

This instruction book contains descriptive material, theory of operation and instructions for installation, operation and maintenance of Radio Transmitting Set AN/FRT-15B. This equipment is being delivered on Contract NObsr-49252.

2. PURPOSE AND BASIC PRINCIPLES.

a. Radio Transmitting Set AN/FRT-15B *(figure 1-1.)* is intended for use in Naval shore or Air Force ground installations and provides a complete transmitting facility except for antenna, power source, crystals and teletype equipment if used (photo equipment is not supplied). It is suitable for application to point-to-point communication, aeronautical ground stations and other services requiring operation on a number of readily selected frequency channels. The equipment has been designed for operation at ambient temperatures between 0°C and 50°C (32°F and 122°F) and in a relative humidity up to 95 percent.

b. The equipment is capable of continuous operation on CW, MCW, phone, frequency shift keying (with phase modulation, if desired) or photo transmission with an output of 3,000 watts within the frequency range of 2 to 12 megacycles, 2,500 watts in the 12 to 26 megacycle range and 2,000 watts in the 26 to 30 megacycle range. The equipment will operate on any frequency in the specific range, selected automatically either locally or remotely by a telephone type dial from ten crystal or ten master oscillator controlled frequencies on which the transmitter has been previously set. Changing channel and/or mode of operation, locally or remotely, requires less than 15 seconds.

The equipment will deliver rated power output into a balanced transmission line of 70 to 800 ohms characteristic impedance when terminated by loads of such value as to produce standing wave ratios not exceeding two to one.

All potentials necessary for operation of the transmitter are derived from a 220 volt, 3 phase 50 to 60 cycle supply. Voltages for operation of Transmitter Control C-1501/FRT-15B *(figure 1-1.)* are derived from a 110 volt, 50 to 60 cycle, one phase supply.

3. DESCRIPTION OF EQUIPMENT.

a. GENERAL.--The transmitter consists of three cabinets finished in gray and mounted side-by-side. The equipment occupies a floor space 33 inches by 84 inches, with the doors closed, and is 84 inches high.

The left cabinet *(in figure 1-2.)* is the Modulator-Oscillator Group OA-745/FRT-15B housed in Electrical Equipment Cabinet CY-1716/FRT-15B. The center cabinet houses the Power Supply Assembly PP-1198/FRT-15B. Radio Frequency Amplifier AM-1116/FRT-15B comprises the group on the right.

Front and rear doors provide access to each cabinet. Ventilation blowers are mounted inside the OA-745/FRT-15B and AM-1116/FRT-15B cabinets, at floor level. Air is exhausted through louvres at the top of the rear access doors. Most of the larger and heavier parts are mounted directly on the cabinet frames or on shelves bolted thereto, and may be removed for servicing purposes. Necessary test cables are provided.

The two remote control units, Transmitter Control C-1501/FRT-15B, are mounted in gray cabinets arranged for mounting on a table or in a 19-inch rack. Desk sets include the telephone type control dial and handset. Telegraph keys are provided. Cables for interconnection of the components in each of the three cabinets are supplied with the equipment. Power supply cables and cables for connecting the transmitter control units to the transmitter are not provided.

The complete equipment consists of the major units, components and accessories as shown in table 1-1.

b. MODULATOR OSCILLATOR GROUP OA-745/FRT-15B *(figure 1-2.)*.—This group contains the following units, from top to bottom.

(1) Meters for monitoring the modulation modulator current: High voltage and line and filament voltage.

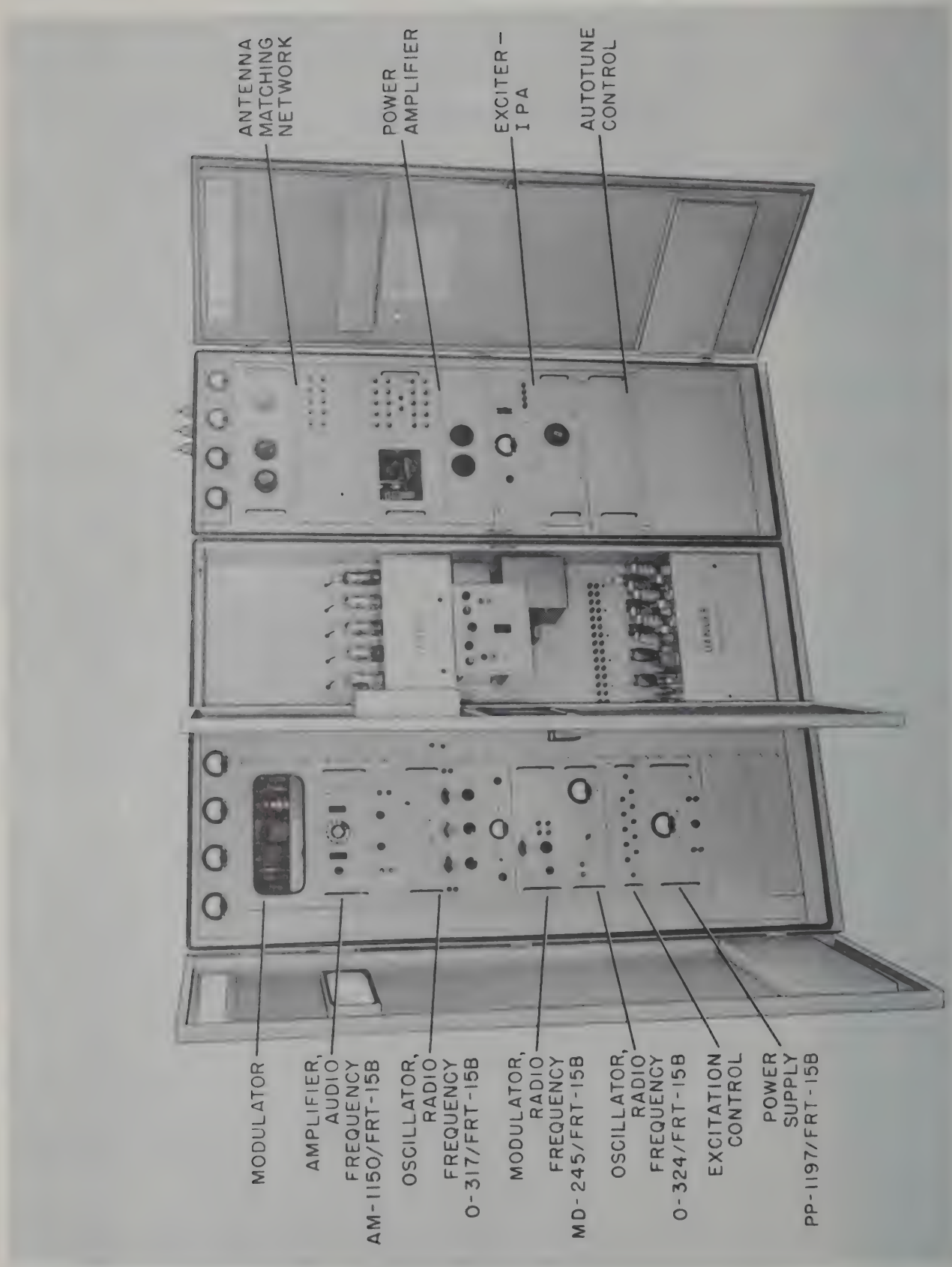


Figure 1-2. Radio Transmitting Set AN/FRT-15B, Relationship of Components

(2) Modulator.

(3) Audio Frequency Amplifier AM-1150/FRT-15B.

(4) Radio Frequency Oscillator 0-317/FRT-15B.

(5) Radio Frequency Modulator MD-245/FRT-15B.

(6) Radio Frequency Oscillator 0-324/FRT-15B.

(7) Excitation Control.

(8) Power Supply PP-1197/FRT-15B.

(9) In the bottom (behind blank panel) are the cabinet blower, the modulation transformer, and the CW relay. Duct work is used inside the cabinet to direct the filtered air stream to the two type 4-1000/A tubes in the modulator chassis.

(10) Space for photo equipment.

c. POWER SUPPLY ASSEMBLY PP-1198/FRT-15B *(figure 1-2)* .— The units comprising the Power Supply Assembly are mounted one above the other on vertical panels. Six type 4B32 rectifier tubes occupy the top position. These tubes are in the 4200 volt high-voltage plate supply. The rectifier filament transformers are located beneath the h-v rectifier tubes. Beneath these transformers at approximately the center of the cabinet is the power control panel with the power controls on the front and the control relays on the back. An access opening in the door of the power supply cabinet permits operation of the power switches in full safety from the high voltage components. Mounting provision for the handset is included in the door. To the right of the control panel are the minus 48 volt supply transformer (top), and the plus 460 and plus 960 volt transformer. Other power transformers are mounted on the rear of the panel that extends down to the fuse bank. Electronic rectifiers and regulators comprise the bottom shelf. These tubes are in the plus 960 and plus 460 volt circuits, and in the minus 400 volt supply. Dividers for bias requirements are located in the rear at the top of this cabinet along with the power amplifier plate voltage dropping resistors. Two line adjustment auto-transformers are mounted at floor level.

d. RADIO FREQUENCY AMPLIFIER AM-1116.--This cabinet contains the following units, from top to bottom.

(1) Antenna input terminals,

(2) Meters for tuning and monitoring the RF circuits,

(3) Antenna Matching Network,

(4) Power Amplifier,

(5) Exciter IPA,

(6) Autotune Control.

(7) The base assembly (behind bottom blank panel) includes the cabinet blower and the autotune drive motor. Duct work is used inside the cabinet to direct the filtered air stream to the two type 4-1000/A power amplifier tubes. A vertical drive shaft operates off the autotune motor, and extends to almost the full height of this cabinet. At appropriate points along this vertical shaft, right angle drives are geared off to the autotune assemblies.

e. TRANSMITTER CONTROL C-1501/FRT-15B *(figure 1-1.)*.—This unit, including desk set and telegraph key, provides control of channel and emission selection by dialing, start-stop control and keying of the transmitter at a remote point. This unit may be located at any distance from the transmitter up to that for which the line loss does not exceed 25 db or the line loop resistance does not exceed 1000-ohms.

The control cabinet occupies a table space of 10 inches by 19 inches and is 8-3/4 inches high. The unit includes an audio amplifier and an audio level control, with a volume indicating meter for monitoring the speech input to the transmitter. A channel indicator provides an indication of the channel on which the transmitter is operating. The proper keying voltage is provided for use in the transmitter during automatic or hand keying. A separate keying potential of minus 60 volts is provided for external use. Control is over two pair (four conductors) and ground return cable (not furnished) leading to the transmitter. The power supply required is 110 volts, 50 to 60 cycles, single phase. Rectified voltage is obtained directly in the transmitter control unit. A power cord with plug is provided.

4. REFERENCE DATA.

a. NOMENCLATURE.—Radio Transmitting Set AN/FRT-15B.

b. CONTRACT DATA.— Contract NObsr-49252 dated 23, June 1950.

TABLE 1-1. EQUIPMENT SUPPLIED

QUANTITY PER EQUIPMENT	NAME OF UNIT	DESIGNATION	OVERALL DIMENSIONS			VOLUME	WEIGHT
			HEIGHT	WIDTH	LENGTH		
1	Modulator-Oscillator Group -consisting of-	OA-745/FRT-15B	84	29	34-1/2	48.7	
1	Modulator		13-1/4	24-3/4	13-1/4	2.4	
1	Audio Frequency Amplifier	AM-1150/FRT-15B	10-1/2	19	16	1.9	
1	Radio Frequency Oscillator	O-317/FRT-15B	10-1/2	19	17	2.1	
1	Radio Frequency Modulator	MD-245/FRT-15B	10-1/2	19	15-1/2	2.0	
1	Radio Frequency Oscillator	O-324/FRT-15B	7	19	10-3/4	0.9	
1	Excitation Control		3-1/2	19	10	1.2	
1	Power Supply	PP-1197/FRT-15B	8-3/4	19	15	1.5	
1	Power Supply Assembly	PP-1198/FRT-15B	84	26	34-1/2	46.7	
1	Radio Frequency Amplifier -consisting of-	AM-1116/FRT-15B	87	29	34-1/2	50	
1	Antenna Matching Network		18	26-1/2	29	8.3	
1	Power Amplifier		18-1/2	26-1/2	29	8.3	
1	Exciter IPA		14-1/4	26-1/2	25	5.9	
1	Autotune Control		8-3/4	26-1/2	10-1/4	1.3	
2	Transmitter Control -including-	C-1501/FRT-15B	8-3/4	19	10	0.9	
2	Desk Set		6	9	8	0.3	
2	Telegraph Key		2-1/2	2-1/4	7-3/4	0.026 cu in.	
1	Operating Tubes	(Refer to Table 1-4)					
1 Set	Interconnecting and accessory items						
Boxes	Maintenance parts						
2	Instruction books	NAVSHIPS 92358(A)					

Unless otherwise stated, dimensions are inches, volume cubic feet, weight pounds.

c. CONTRACTOR.—Electronic Measurements Company, Inc., Lewis Street and Maple Avenue, Eatontown, New Jersey, U.S.A.

d. COGNIZANT NAVAL INSPECTOR.—Inspector of Naval Material, Newark, New Jersey.

e. SHIPPING DATA.

(1) NUMBER OF BOXES.—6

(2) EQUIPMENT SPARES.—5 steel boxes 24 x 15 x 15

(3) TOTAL CUBICAL CONTENTS.
(a) CRATED.— 322.5 cu ft
(b) UNCRATED.— 242.5 cu ft

(4) TOTAL WEIGHT.
(a) CRATED.— 4,973 lbs
(b) UNCRATED.— 4,170 lbs

5. ELECTRICAL CHARACTERISTICS.

a. FREQUENCY DATA.

(1) RANGE.—2 to 30 MC.

(2) TUNING.—Continuous in ten bands over entire range.

(3) CHANNELS.—10.

(4) PRESET FREQUENCIES.—10.

(5) MANUALLY TUNED.—Any of 10 channels.

(6) CONTROL TYPE.—Crystal or master oscillator excitation on any of the 10 channels.

(7) SELECTION.—After manual presetting, any one of the 10 channels may be selected by a telephone type dial, either local or remote.

(8) TIME TO CHANGE PRESET FREQUENCY AND/OR MODE OF OPERATION.—15 seconds, or less.

b. NOMINAL RF OUTPUT POWER.—(Includes sideband power when modulated). Balanced output transmission line of 70 to 800-ohms impedance. Maximum SWR with load connected—two to one.

(1) 2-12 MC — 3000 watts.

(2) 12-26 MC — 2500 watts.

(3) 26-30 MC — 2000 watts.

c. TYPES OF EMISSION. CW(A_1), MCW(A_2), Phone(A_3), Facsimile(F_1), and FSK(F_4).—FSK may also be used with phase modulation. Phototransmission can also be employed.

(1) MODULATION.

(*a*) MOD CW.—1000 cps adjustable to 100 percent.

(*b*) VOICE.

1. INPUT.—Minus 25 to 0 db above 6 mw into 500 ohms impedance.

2. AUDIO RESPONSE.—Flat within ± 3 db from 150 to 3500 cps.

3. COMPRESSION.—Controlled by R-326A/B. Above 70 percent modulation, 10 db increase in input results in less than 3 db change in modulation level.

4. MOD CAPABILITY.—100 percent.

(*c*) FREQUENCY SHIFT KEYED.

1. TYPE.—Reactance tube modulated crystal oscillator.

2. NOMINAL FREQUENCY SHIFT OSCILLATOR FREQUENCY.—200 kc.

3. DEVIATION.—Adjustable from 0 to ± 500 cycles.

4. DEVIATION RESPONSE. —Linear with respect to dc input voltage within 2 db to 2000 cps.

5. STABILITY.—Within 10 cps from 0 to 200 cps, and p/m five percent between 200 and 1000 cps.

(*d*) FREQUENCY SHIFT KEYED WITH PHASE MODULATION.—Same as preceding subparagraph except with phase modulation added.

1. FREQUENCY OF PHASE MOD.—200 cps ± 5 percent.

2. PHASE DISPLACEMENT AT ANTENNA.—One radian plus or minus 0.1 radian.

(*e*) PHOTOTRANSMISSION.

1. INPUT SIGNAL.—Peak magnitude of +1 to +20 volts.

2. INPUT IMPEDANCE. — 600-ohms ± 10 percent.

3. MAXIMUM DEVIATION.—Zero Signal....-1000 cps from mean carrier frequency. Peak signal ....+1000 cps above mean carrier.

4. RESPONSE.—Peak of any AC signal voltage of 0 to 2000 cps is within ± 2 db of DC voltage to cause same deviation.

d. KEYING.

(1) TYPE.—Polar or neutral.

(2) RANGE.
(*a*) POLAR.—+30 to +135—mark.
-30 to -135—space.

(*b*) NEUTRAL.—0 to +30 up to +135—mark.
0—space.

(3) CONTROL.—Local or remote.

(4) SPEED.—On-off up to 500 w.p.m.—MCW up to 50 w.p.m. Frequency shift up to 240 dot cycles.

Note

ON MCW, THE MODULATION AS WELL AS THE CARRIER IS KEYED.

e. CONTROL.

(1) LOCAL.—Start and stop by manual switches. Emission and channel selection by telephone-type dial.

(2) REMOTE.—Initial start at transmitter only. Re-start, stand-by stop, emission and channel selection by telephone-type dial.

f. CRYSTALS. For use in Radio Frequency Oscillator O-324/FRT-15B *(figure 1-2.)*.

(1) TYPE.—CR-27/U.

(2) QUANTITY.—One to ten.

(3) FREQUENCY RANGE.—2.0 to 4.2 Mc.

(4) OPERATING TEMPERATURE.—70° C ±1°C.

g. MASTER OSCILLATOR.

(1) OSCILLATOR FREQUENCY RANGE.—2.0 to 4.2 Mc.

(2) TYPE OF CIRCUIT.—Crystal controlled harmonic generator with interpolation oscillator, mixers, filters, two-phase comparator network and two-phase frequency-correcting motor.

(3) FREQUENCY CALIBRATION.—Within 30 cycles when set-up on three direct reading dials.

h. FREQUENCY STABILITY DATA. (Maximum deviation).

(1) Over temperature range of 0°C to 50°C —20 cycles.

(2) Over relative humidity range of 30 percent to 95 percent—20 cycles.

(3) Over a supply line frequency range of 5 percent—20 cycles.

(4) Under any combination of the factors in the three preceding sub-paragraphs — 20 cycles. Also, the circuits of the Radio Frequency Modulator MD-245/FRT-15B *(figure 1-2.)* (frequency shift keyer) will not contribute more than 40 cycles instability to the assigned carrier frequency.

i. POWER SUPPLY DATA.

		STAND BY (FIL. ON)	FULL PWR*
E	Line Phase 1	220 V	220 V
E	Line Phase 2	217 V	215 V
I	Line Phase 1	5.3 A	21.4 A
I	Line Phase 2	6.8 A	22.4 A
KW	Phase 1	1.080	4.440
KW	Phase 2	1.040	3.260
KW	TOTAL	2.120	7.700
KVA		2.265 av'g	8.350 av'g
Power Factor		94%	93%

*Channel 1, 2 Mc, 3.4 KW

j. HEAT DISSIPATION.

(1) Radio Transmitting Set AN/FRT-15B; 5 KW, approximately.

(2) Transmitter Control C-1501/FRT-15B; 50 watts, approximately.

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

QUANTITY PER EQUIPMENT	NAME OF UNIT	DESIGNATION	REQUIRED USE	REQUIRED CHARACTERISTICS
1 to 10	Crystals	CR-27/U	Channel frequency determination	2000 to 4200 kc, Temp. range 70°C ±1°C
2	Antenna and RF transmission line		Output	70 to 800-ohm balanced line
2	Transmission line current meters		Measuring RF output	RF ammeters-range depending on line impedance
1	Keyer adapter (optional)	KY-44( )/FX	Adapting external facsimile to transmitter	Input: -20 to +6dbm Output: 0 to +20 V
1	Master oscillator (optional)		Emergency operation of transmitter	2.0 to 4.2 Mc
1 or 2	Remote control cables		Connect Transmitter Control C-1501/FRT-15B	4 conductor cable (2 pair with gnd return)
1	Remote transfer switch		Switching remote control points when two transmitter controls are used	4 pole, double throw anti-capacity type switch
1	Handset		Local operation	Telephone type w/ push-to-talk sw; carbon mic. 100 ohms, 1.5 to 6 volts dc input; receiver 40 ohms dc w/cable 4 ft lg having PL-55 and PL-68 tele plugs

TABLE 1-3. SHIPPING DATA

SHIPPING BOX NO.	NAME OF UNIT	DESIGNATION	OVERALL DIMENSIONS			VOLUME	WEIGHT
			HEIGHT	WIDTH	DEPTH		
1.	Amplifier, R. F. Less V-1301, V-1302, O-1321, and O-1322.	AM-1116/FRT-15B	43	95	44	100.00	1395
2.	Power Supply Assy. Less T-1603, V-530 thru V-541.	PP-1198/FRT-15B	43	95	44	100.00	1415
3.	Modulator Oscillator Group. Less V-309, V-310, O-309, O-310.	OA-745/FRT-15B	43	95	44	100.00	1451
4.	Control Transmitter, Transmitting Key and Plug, Desk Set. (2 each) One set accessory test Cables, W-1901 thru W-1908, and W-1911.	C-1501/FRT-15B	31	26.5	11.5	5.5	154
5.	Transformer, Symbol T-1603, p/o PP-1198/FRT-15B.	SNSN 17-T-78170-5501	19.5	25	15.5	4.5	447
6.	Chimney, O-309, O-310, O-1321, and O-1322. Tubes V-530 thru V-535 Tubes V-536 thru V-541 Tubes V-309, V-310, V-1321, and V-1322.	SNSN N16-C-289001-101 SNSN N16-T-53228 SNSN N16-T-54232 SNSN N16-T-54075	24	42	22	12.5	111
1.	USCG Equipment Maintenance Spare Parts.		22	22	22	6.0	65
2.	"		13	25.25	16	3.0	230
3.	"		13	25.25	16	3.0	105
4.	"		13	25.25	16	3.0	70
5.	"		13	25.25	16	3.0	55
1.	Air Force Equipment Maintenance Spare Parts.		12	27	21	3.9	55
2.	"		13	25.25	16	3.0	100
3.	"		13	25.25	16	3.0	50

Unless otherwise stated, dimensions are inches, volume cubic feet, weight pounds.

TABLE 1-4. ELECTRON TUBE COMPLEMENT

TUBE TYPE	MODULATOR	AUDIO AM-1150/	OSCILLATOR O-317/	FSK MD-245/	OSCILLATOR O-324/	POWER SUPPLY PP-1197/	POWER ASSEMBLY PP-1198/	POWER AMPLIFIER	EXCITER IPA	TRANSMITTER CONTROL C-1501/	TOTAL
3B28							6				6
3-7						4					4
4B32							6				6
4/65A									2		2
4/1000A	2							2			4
5R4WGYA						2				1	3
5654			8		1						9
5670			8	1							9
5686			5	1							6
5726			2	1							3
5749			1	1							2
5750			4	2							6
5814A				1					3		4
6AG7					1						1
6AS7C						3			1		4
6AU6WA				4		2	1				7
6C8G		2									2
6J5										2	2
6J6				1							1
6L6						1				1	2
6SH7									1	1	2
6SJ7WGT		1	2*								3
6SL7WGT		1									1
6SN7WGT		3									3
6V6GT									2		2
6X4W						1					1
6X5WGT		1									1
807							6		1		7
OA3/VR75					2					2	4
OA-2WA							5				5
OB-2WA						1		1			2
TOTAL	2	8	30	12	4	14	24	2	11	7	114

*Part of Z-101, Z-102 sealed oscillators

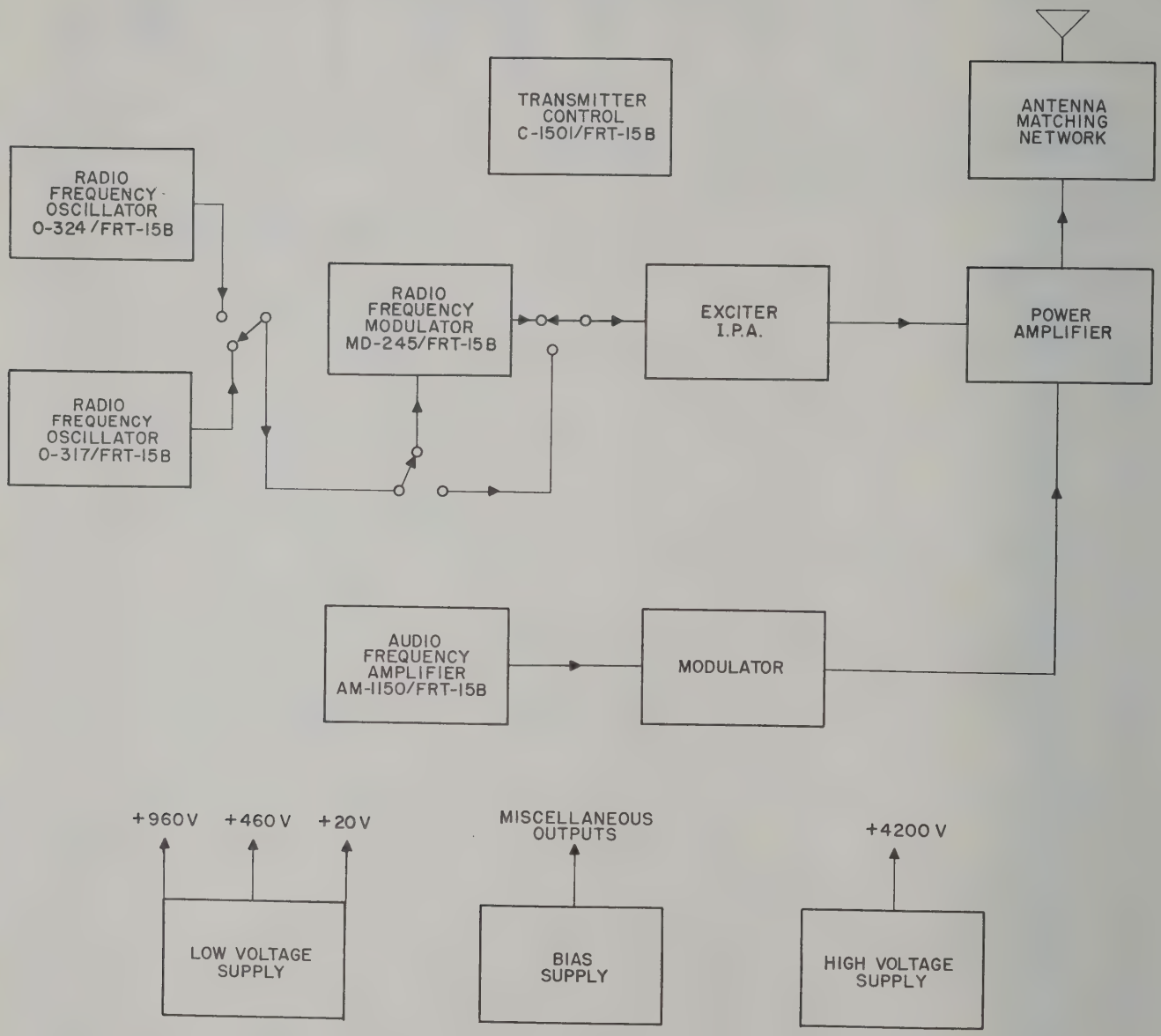


Figure 2-1. Radio Transmitting Set AN/FRT-15B, Block Diagram

SECTION 2
THEORY OF OPERATION

1. GENERAL.

a. Radio Transmitting Set AN/FRT-15B is discussed in terms of the RF circuits, the frequency shift keyer, audio circuits, power supply circuits, and operating control circuits.

b. The functional relationship of the major categories is shown in the block diagram, figure 2-1.

(1) The basic frequency determining circuits are the Radio Frequency Oscillator O-324/FRT-15B *(see figure 1-2.)*, the Radio Frequency Oscillator O-317/FRT-15B, and the frequency shift oscillator in the Radio Frequency Modulator MD-245/FRT-15B. Either the O-324/FRT-15B (crystal oscillator) output, or the O-317/FRT-15B (master oscillator) output can be selected to supply the desired fundamental frequency for use in either the frequency shift keyer or the Exciter-IPA (multiplier-intermediate power amplifier) sections.

(2) The frequency multipliers are set up as doublers or as straight-through amplifiers, depending on the multiplying factor required to obtain the desired transmitter output frequency. The multiplying factor may be 1,2,4 or 8 and is set up automatically when the frequency band is selected. The output from the third multiplier, at carrier frequency, is injected in the Class C intermediate power amplifier, which in turn, drives the power amplifier stage.

(3) The Audio Frequency Amplifier AM-1150/FRT-15B (speech amplifier) contains a limiter and squelch stage that provides compression for modulation over 70 percent when the limiter control is set. This output excites the driver stage, which in turn, drives the modulator.

(4) The modulator stage consists of two type 4-1000/A tubes in push-pull, the output of which is coupled through the modulation transformer to the plate and screen of the RF power amplifier.

(5) The RF power amplifier consists of two 4-1000/A air-cooled tubes in parallel in a Class C amplifier circuit. The plate tank is tuned by a vacuum type variable capacitor and three inductor coils. Aperture coupling to the Antenna Matching Network is used. Variable coil-coupling and capacity tuning facilitate loading and matching of the output circuit to the antenna. A balanced two-wire line approximately equal to the antenna or grid input impedance is intended for use between the transmitter output and the antenna or an RF power amplifier equipment. Output frequency and power data are given in paragraph 5 of section 1.

(6) Transmitter Control C-1501/FRT-15B includes an audio amplifier for use in voice-modulating the Radio Transmitting Set from a remote point. Its output is injected in the transmitter speech-amplifier. The Radio Transmitting Set can be keyed either manually or automatically through Transmitter Control C-1501/FRT-15B.

(7) A +4200 volt power supply of the delta to wye three-phase full-wave rectifier type provides plate voltage for the RF power amplifier tubes. Under phone or MCW conditions, +4200V is applied to the modulator plates through the primary of the modulation transformer, and also to the power amplifier through the secondary of the modulation transformer. A single-phase, full-wave, choke input power supply provides plate and screen power for the remainder of the equipment with the exception of the Radio Frequency Oscillator O-317/FRT-15B and the Radio Frequency Modulator MD-245/FRT-15B. Both these units are operated from a single independent Power Supply PP-1197/FRT-15B *(see figure 1-2.)*. Various fixed bias voltages are supplied from a single-phase, full-wave, choke input power supply.

(8) Power control circuits include the MAIN LINE circuit breaker, FILAMENT, PLATE, and HIGH VOLTAGE TUNE-OPERATE switches. Power for the DC control relays is

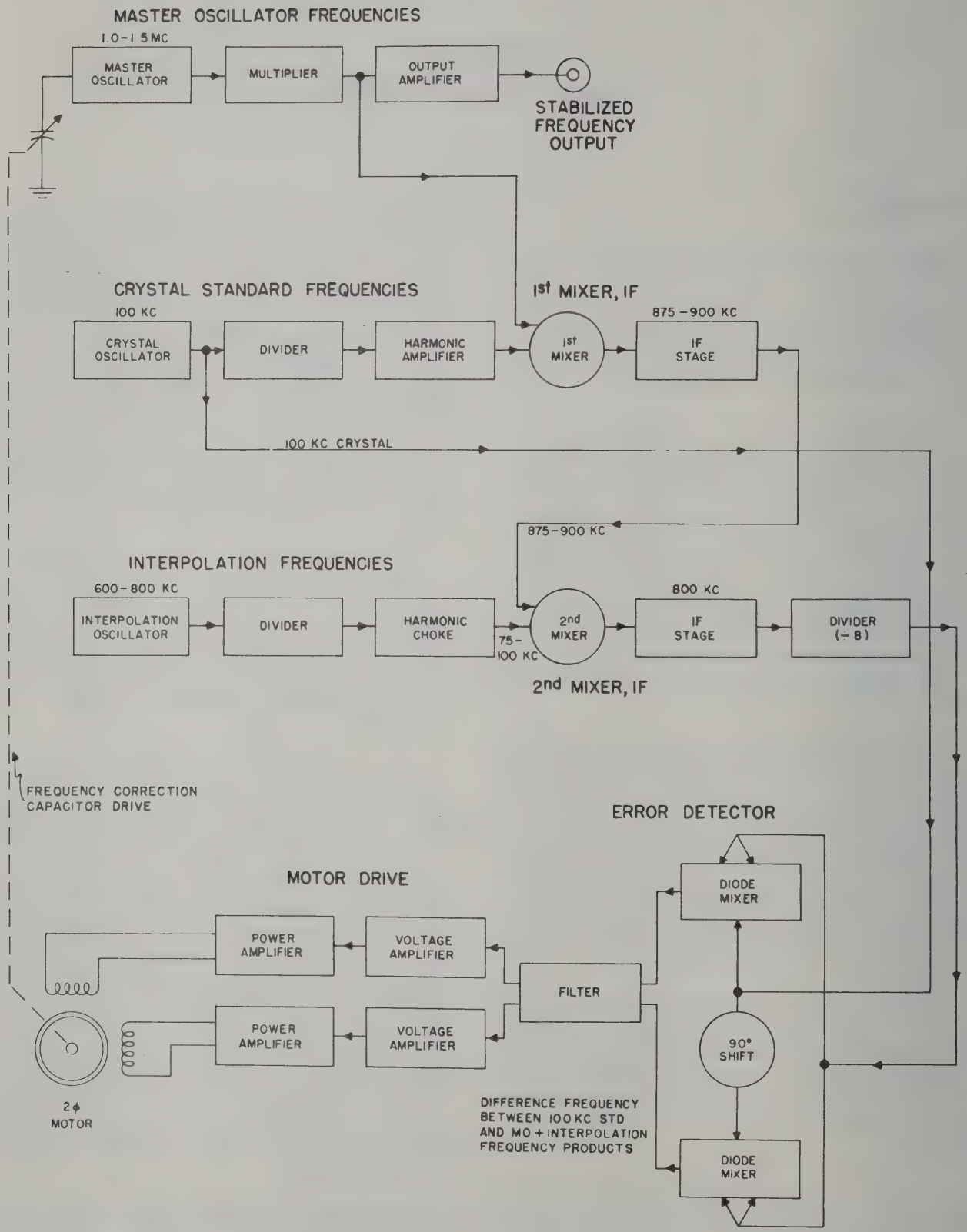


Figure 2-2 Radio Frequency Oscillator 0-317/FRT-15B, Block Diagram

provided by a bridge-type selenium rectifier with a -48 volt output (nominal 60 volts to 65 volts). A time-delay relay, air-flow interlocks, interlocks on access doors, bias interlock relay, and over-load protection features are incorporated in the control circuitry. Fuses are included at every point where equipment and personnel safety require their use.

(9) Operational control circuits include the telephone-type dial, associated relays, automatic tuning heads and their drives, stepper motors, and motors (autotune system). By use of the telephone dial, the desired channel and emission can be selected from either local (telephone-type dial on front panel of Audio Frequency Amplifier AM-1150/FRT-15B, figure 1-2), or remote (see Control Transmitter C-1501/FRT-15B, *(figure 1-1.)* positions. Dialing the desired channel results in the automatic switching and tuning of the transmitter on the selected, preset, channel frequency. Channel dialing automatically sets the transmitter on phone — other modes must be selected by an additional dialing operation.

(10) The transmitter includes various indicators for monitoring the power supplies, operational conditions, and transmitter audio and RF circuit operation.

2. RF CIRCUITS.

a. RADIO FREQUENCY OSCILLATOR O-317/FRT-15B.

(1) GENERAL *(see figure 2-2)* .—This unit contains a master oscillator of the Hartley type, inductance tuned from 1 to 1.5 megacycles. The panel dial is directly calibrated from 2 to 3 and 3 to 4-1/2 megacycles. The master oscillator is hermetically sealed to provide a high degree of inherent stability. The very high, over-all stability required is obtained by comparing the harmonics of this master oscillator with harmonics derived from a highly stable crystal oscillator providing a low difference frequency in a first IF amplifier system.

The product is mixed with an adjustable frequency derived from an interpolation oscillator. This permits the master oscillator to be set to points which fall between crystal harmonics as well as the coincident points. The output of the second IF is reduced to the fundamental frequency of the crystal oscillator with which it is then compared. Any resultant beat constitutes an error signal. This error is used to energize a motor that drives a correcting capacitor in the variable master oscillator.

(2) DETAIL *(see figure 2-3)*

(*a*) 100 KC STANDARD.--When the AC power is supplied to the crystal oven E-111 and the thermostatic switch is closed, the neon indicator light illuminates. Oven-temperature is thermostatically controlled and is maintained between 59°C to 61°C (138.2°F to 141.8°F). Operational stability is attained within one hour following application of the AC power.

The 100 kc oscillator V-101 has two outputs. Capacitor C-210 serves to couple the 100 kc voltage to the control grid of the buffer amplifier V-129. Coupling capacitor C-105 also passes the 100 kc voltage to another buffer amplifier, V-107. This amplifier supplies the 100 kc divider input voltage. Dividers V-102 and V-103 are conventional multivibrator circuits. Their combined influence on the 100 kc frequency results in a 25 kc output to the first harmonic amplifier V-106. Spectrum amplifiers V-104 and V-105 amplify the 25 kc harmonics in the frequency range of 9.11 to 21.6 Mc, for mixing and attenuating other harmonics. The two tuned circuits Z-106, C-120B, and Z-107, C-120A provide the proper selectivity to prevent an image frequency from impairing the operation of the succeeding stages. The tuning capacitors are ganged to the plate tuning capacitors C-120 C/D in the frequency multiplier stages V-112, V-113 of the master oscillator circuit. Simultaneous tracking of the frequency multipliers and spectrum amplifiers assures that the correct frequencies will be admitted to the first IF mixer, V-108. Capacitor C-129 couples the output from spectrum amplifier V-105 to the third grid of V-108.

(*b*) MASTER OSCILLATOR.—The master oscillator is contained in a sealed chamber Z-101 filled with an inert gas. Oscillator frequency is controlled (stabilized) by C-128 which is externally situated with respect to the sealed chamber. C-126 is automatically operated by the two-phase motor B-102, and is therefore part of the AFC loop. Oscillator frequency is continuously variable over the range from 1.0 to 1.5 Mc.

Output frequency is amplified and multiplied by V-112. Tube V-112 supplies excitation for V-114, the final amplifier. Because the master oscillator is automatically stabilized by the AFC loop, the frequency that reaches the final amplifier V-114 is stabilized and ready for use in the transmitter section.

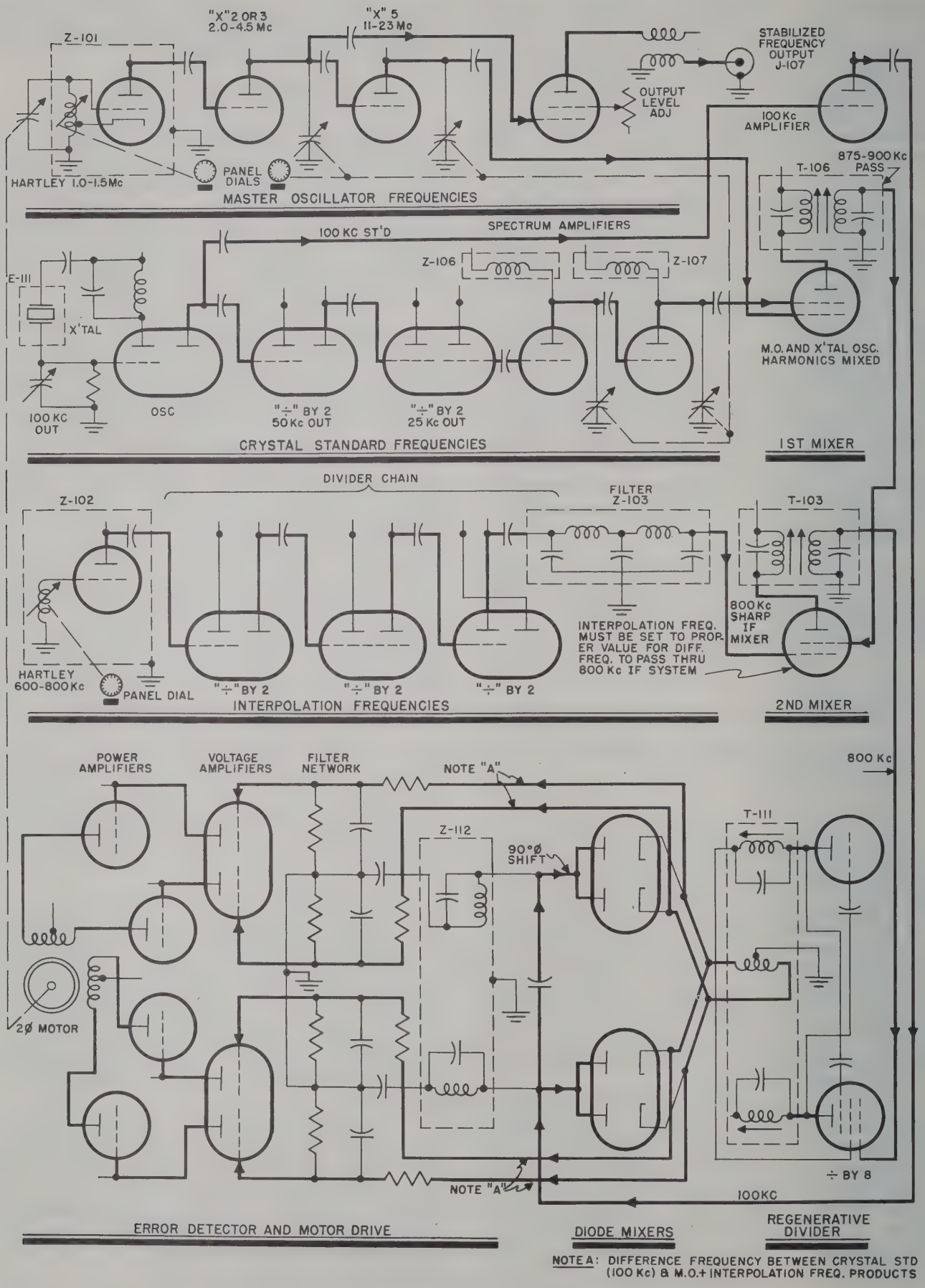


Figure 2-3. Radio Frequency Oscillator 0-317/FRT-15B, Simplified Schematic

A shielded co-axial cable carries the stabilized frequency from the untuned plate circuit of V-114 to the output receptacle J-107.

The plate circuit of the first multiplier tube V-112 is tuned by Z-104, C-120D, and trimmer C-252. AC components in the range 2.0 to 4.5 Mc are amplified and then coupled by C-159 to the control grid of the second multiplier tube V-113. Z-105 and C-120C and trimmer C-128C tune the plate of V-113 to a band of frequencies in the range from 10 to 22.5 Mc, approximately. The output is coupled by C-130 to the control grid of the first IF mixer tube V-108. Mixer tube V-108 then has two distinct and different frequencies on its grids, i.e., the one frequency originating in the master oscillator circuit, and the output of the spectrum amplifier V-105. V-108 beats the sum and difference frequencies but only the difference frequencies are amplified and inductively coupled by virtue of the selectivity of the first IF transformer T-106. Further amplification and selectivity of the difference frequency is afforded by the next IF circuit comprising V-109, T-107. The combination of V-108, T-106 and V-109, T-107 results in a band of output frequencies in the range from 875 to 900 kc. This band of frequencies is used to excite the third grid of the second IF mixer tube, V-110. The function of V-110 is explained in the following paragraph concerning the derivation and usage of the interpolation frequency.

(*c*) INTERPOLATION FREQUENCY. — The variable inductor in the tuned grid circuit of the interpolation oscillator is used to resonant the circuit at the selected interpolation frequency. Tube V-118 serves as a buffer amplifier for the interpolation circuit which consists of three conventional divide-by-two multivibrators. Low pass filter Z-103 attenuates the higher order harmonics of the selected frequency for the purpose of preventing spurious voltages, due to these harmonics, from occurring in the 800 kc IF strip. The selected interpolation frequency is coupled directly out of Z-103 to the number one grid of the second IF mixer tube, V-110.

The output difference frequency from the first IF strip and the output from the interpolation circuit is selected and amplified in the 800 kc IF strip. This second IF strip is tuned to a relatively narrow band of frequencies centering about 800 kc. This output voltage is injected on the number one grid of V-127 in the regenerative divider circuit. After dividing the 800 kc frequency by a factor of eight, the resulting 100 kc is compared with the 100 kc output from the crystal standard. How this comparison is effected and the way in which the resultant comparison voltage is used to direct the action of the AFC loop is explained in the following paragraph.

(*d*) AFC. — The 100 kc voltage output from the regenerative divider is compared with the 100 kc crystal standard in a pair of diode mixers V-125, V-126. The output of buffer-amplifier V-129 is coupled to the plate circuits of the diode mixers, while the regenerative divider output is coupled to the cathode circuit through the divider transformer T-111. All mixer products except the difference (audible) frequency are attenuated by the low-pass filter network, R-218, R-213, C-179, C-180, and R-219, R-215, C-181, C-182, C-183, and C-184. This filter terminates on the grids of the dc amplifiers V-123 and V-124. Power amplifiers V-119 through V-122 are driven from the plate circuits of the dc amplifiers. One phase of the two phase motor B-102 is supplied from V-121, V-122. The second phase of the motor is supplied from V-119, V-120. This latter supply has been phase displaced (90 degrees) from the former. The 90 degree shift is accomplished by a phase shifting capacitor C-211 in the plate of V-125.

Earphones can be coupled in the AFC loop at J-109. Use of the earphones will permit the operator to hear any difference frequency output from V-124. This feature aids the operator in setting the master oscillator within the frequency range of the AFC loop response -- from 1 to approximately 500 cps. The AFC motor rotates in the proper direction to either increase or decrease the capacitance of C-126, depending on whether the master oscillator frequency output is less than or higher than it should be as determined by the frequency comparison method just described.

b. RADIO FREQUENCY OSCILLATOR O-324/FRT-15B *(see figure 7-61.)*. — The crystal oscillator supplies RF voltage from 2 to 4.2 Mc. Frequency selection is automatically accomplished by switching any one of ten piezo crystals into the grid circuit of the RF oscillator tube.

When the channel is dialed, crystal selector switches S-904 and S-902B select the desired one of the available crystals Y-901 through Y-910 and the corresponding frequency adjusting capacitor C-901 through C-910. Stepper motor S-902 is used to position both S-904 and S-902B.

Provision for mounting ten crystals of the AN/CR27-U type is included in the heat-insulated oven E-914. An oven heater HR-901 is provided to bring the oven temperature up to +70°C (158° F) at which point cyclic operation of the thermostat S-901 will cause the temperature to remain within ±1°C (±1.8° F).

Oscillator-amplifier V-901 is employed in an electron-coupled type of oscillator circuit. The plate of this tube is broadly tuned because frequency changing consists solely in the selection of the proper crystal at the grid. Inductor L-903 serves as an RF choke while C-914 effectively grounds the screen to alternating currents.

The amplified RF voltage appearing at the plate of V-901 is coupled through capacitor C-915 to the grid of buffer-amplifier V-902. Inductor L-904 serves as a peaker. V-902 plate and screen voltages are stabilized to insure a constant RF output level.

V-902 prevents load variations in the output circuit from affecting the frequency of oscillation as determined by the selected constants in the grid-to-cathode circuit of V-901.

Impedance matching to the 50-ohm transmission line from output jack J-903 is effected by transformer T-902 in the plate-to-screen circuit of V-902. The RF output voltage level is approximately 4 to 5 V RMS.

Plate and screen voltage for the buffer-amplifier V-902 is regulated at +150V by the series connected type VR-75's, V-903 and V-904. Single phase, 220 V AC is supplied to the primary of T-901. The secondary develops 12.6V at 2.5 amperes. One end of the secondary and the center tap are used in the filament supply circuit for tube V-902, while the other end is grounded to the crystal oscillator chassis. The filament of V-901 is connected from the center tap to ground. Power for heater HR-901 is also supplied by T-901--from terminals five and seven. FIL indicator, I-901, illuminates when T-901 is operating, and OVEN indicator I-902 illuminates when control relay K-901 is energized. Operation of the MAIN CIRCUIT BREAKER and the FILAMENT ON switches located on the Power Supply Assembly PP-1198/FRT-15B front panel energize K-901 if the oven thermostat control S-901 is closed.

c. MULTIPLIER, INTERMEDIATE POWER AMPLIFIER AND KEYER *(see figure 7-67.)*.

(1) Intelligence from either the Radio Frequency Modulator MD-245/FRT-15B (frequency shift keyer), the Radio Frequency Oscillator O-324/FRT-15B (crystal oscillator), or the Radio Frequency Oscillator O-317/FRT-15B (master oscillator) enters this chassis through jack J-1103. The voltage level of the input signal is approximately 2V and is between two and four megacycles. An on-off keying circuit that includes S-1103, V-1201, V-1202, V-1203 and their associated components is used to switch the CW on and off in response to a key, and also to switch the audio and RF on and off when operating MCW.

Electron tubes V-1101, V-1102, V-1103 are in individually tunable circuits. A single autotune head O-1112, is used to position all three plate tuning capacitors C-1106, C-1140 and C-1141. When the operating band is selected, S-1101 sets itself to the predetermined position. This results in the circuits V-1101, V-1102, V-1103 setting themselves up for one of the following:

(*a*) Three stages of double multiplication (output 16-30 Mc). V-1101, V-1102, V-1103 are used as multipliers.

(*b*) Two stages of double multiplication (output 8-16 Mc). V-1101, V-1102 are used as multipliers; V-1103 as an amplifier.

(*c*) Single stage double multiplication (output 4-8 Mc). V-1101 is used as a multiplier and V-1102, V-1103 as amplifiers.

(*d*) Straight-through handling (output 2-4 Mc). V-1101, V-1102, V-1103 all used as amplifiers.

(2) In the keying circuit, V-1202 is used to furnish squelch bias to the audio circuits of the speech amplifier. Part of this output is used to drive the grids of V-1203 which are tied together. V-1203 is used to furnish a negative bias to V-1101 and V-1102 for switching the carrier on and off.

In the key up (carrier off) condition, V-1201A is cut off and V-1201B is normally conducting. V-1202A is cut off because its two grids are connected to a -400 volt potential. V-1203 is normally conducting providing a negative bias to the grids of V-1101 and V-1102, across R-1220 and R-1221.

When the transmitter is keyed, a positive potential of +70 volts is applied to the grid of V-1201A causing this tube to conduct heavily, resulting in a decreased plate potential.

Since the grid of V-1201B is directly coupled to the plate of V-1201A, through resistor R-1209, V-1201B is cut off. This causes the grid of V-1202 to go positive. This positive voltage on the grid makes V-1202 conduct heavily. The plate current of V-1202 passes through R-1216 making the plate side approximately 70 volts negative with respect to ground. This is the squelch bias which is applied to the audio circuits through pin No. 18 of J-1102.

This conduction of V-1202 cuts V-1203 off by virtue of the direct coupling to the plate of V-1202 through resistors R-1217 and R-1218. When V-1203 is cut off, current no longer passes through R-1220 and R-1221, removing the bias on V-1101 and V-1102. The carrier is keyed on by dialing "A4". This operation energizes K-

609 (FSK) relay, in the Autotune Control Unit, which removes the ground from the cathode (pin 8) of V-1201. With the ground removed, the cathode potential rises, which cuts the tube off, causing the plate voltage to rise. This plate is coupled to the grid of V-1202 and keying is accomplished in the same manner as described in the preceding paragraphs.

Drive adjustments (R-1114 through R-1117 and R-1161) are available over the entire range 2-30 Mc in five steps corresponding to each band. The adjustments are located in the screen circuit of V-1103. The purpose of these drive adjustments is to set the driving level on the I.P.A. output tubes V-1104 and V-1105. This effectively controls the amount of RF drive on the grids of the power amplifier tubes V-1301 and V-1302. This adjustment is made by setting the power amplifier grid current to 110 ma with full power output.

The intermediate power amplifier uses two type 4-65/A tubes V-1104, V-1105 operated as conventional class C amplifiers in a parallel-fed parallel-output circuit. A distributed-constant capacitor assembly C-1128 is used as the filament-screen by-pass. Damping in the cathode circuit is done by R-1132 through R-1135 with C-1125, C-1126 acting as lumped by-passes.

Voltage to the screens of V-1101 through V-1105, to the plates of V-1101, V-1102 and to the grid of V-1201 through S-1103, is supplied by the series regulator V-1107 operating from a reference level established by the regulator tube V-1204. A bleeder chain comprising R-1148 through R-1158 is used to pick off one of ten voltage levels that corresponds to the selected channel. The selected voltage is connected through J-1102 and the speech amplifier to the Transmitter Control C-1501/FRT-15, where it is used to operate M-402 -- the CHANNEL INDICATOR meter. Filament power for operation of all tubes in the Exciter-I.P.A. chassis is supplied directly from T-1101 and T-1102.

Meter M-1101 has five positions for monitoring any one of the following functions:

(*a*) OFF
(*b*) Grid current, V-1102
(*c*) Grid current, V-1103
(*d*) Plate current, V-1103
(*e*) Grid current, V-1104 and V-1105

d. POWER AMPLIFIER *(see figure 7-66.)* .— The power amplifier circuit employs two type 4-1000/A tetrode transmitter tubes V-1301 and V-1302 in a conventional class C circuit. The tubes are connected in parallel with the input signal to the grids supplied by the parallel connected intermediate amplifier stage. Fixed bias, regulated to -125 volts DC, and screen supply voltage at +460 volts DC are supplied from the Power Supply Assembly PP-1198/FRT-15B. The full output voltage (+4200V) of the high voltage rectifier supply is applied to the plates of V-1301 and V-1302 through the decoupling resistor R-1316.

Tuning of the grid circuit for maximum excitation is accomplished at the tank consisting of L-1302 through L-1304 and C-1301. The amount of inductance in the grid circuit may be varied by operation of the selector switch S-1324. This switch is automatically positioned by B-1302, one of the motors in the autotune system. Grid bias voltage is supplied through RF choke L-1305. Variable capacitor C-1320 is used to adjust the coupling from the intermediate amplifier to the grids of the power amplifier. Parasitic suppressors are included in each of the parallel grid leads and also in the plate leads from the tubes to the plate tank.

The plate tank consists of coils L-1311, L-1313, L-1314 and capacitor C-1307. The degree of coupling to the Antenna Matching Network is controlled by the position of a coupling plate that is physically located between the plate tank coils and the coils comprising the Antenna Matching Network.

The amount of insertion that the coupling plate makes between the sets of coils is controlled by autotune head 0-1427 (COUPLING) in the autotune system.

e. ANTENNA MATCHING NETWORK *(see figure 7-65.)* .—The RF output from the power amplifier is coupled to the output coils L-1401, L-1402, L-1403. The degree of coupling is made adjustable by sliding the coupling plate between the tank coil(s) and the output coil(s). Output coils L-1401, L-1402, L-1403 cover jointly the range from 2 to 30 Mc in 10 bands. The amount of inductance may be varied by operation of the selector switch S-1414. This switch is controlled by B-1401, one of the motors in the autotune system.

The output network is arranged for matching to a balanced antenna of 70 to 800 ohms and having a standing wave ratio not greater than 2 to 1. To provide this, the output tuning capacitor C-1401 is placed in series with a double section variable matching capacitor C-1406—the rotors of which are grounded. Both C-1401 and C-1406 are connected across the output coil(s). Motor B-1402 drives selector S-1415 until the seeking switch S-1402 finds the selected channel ground. Selector S-1415 is used to select

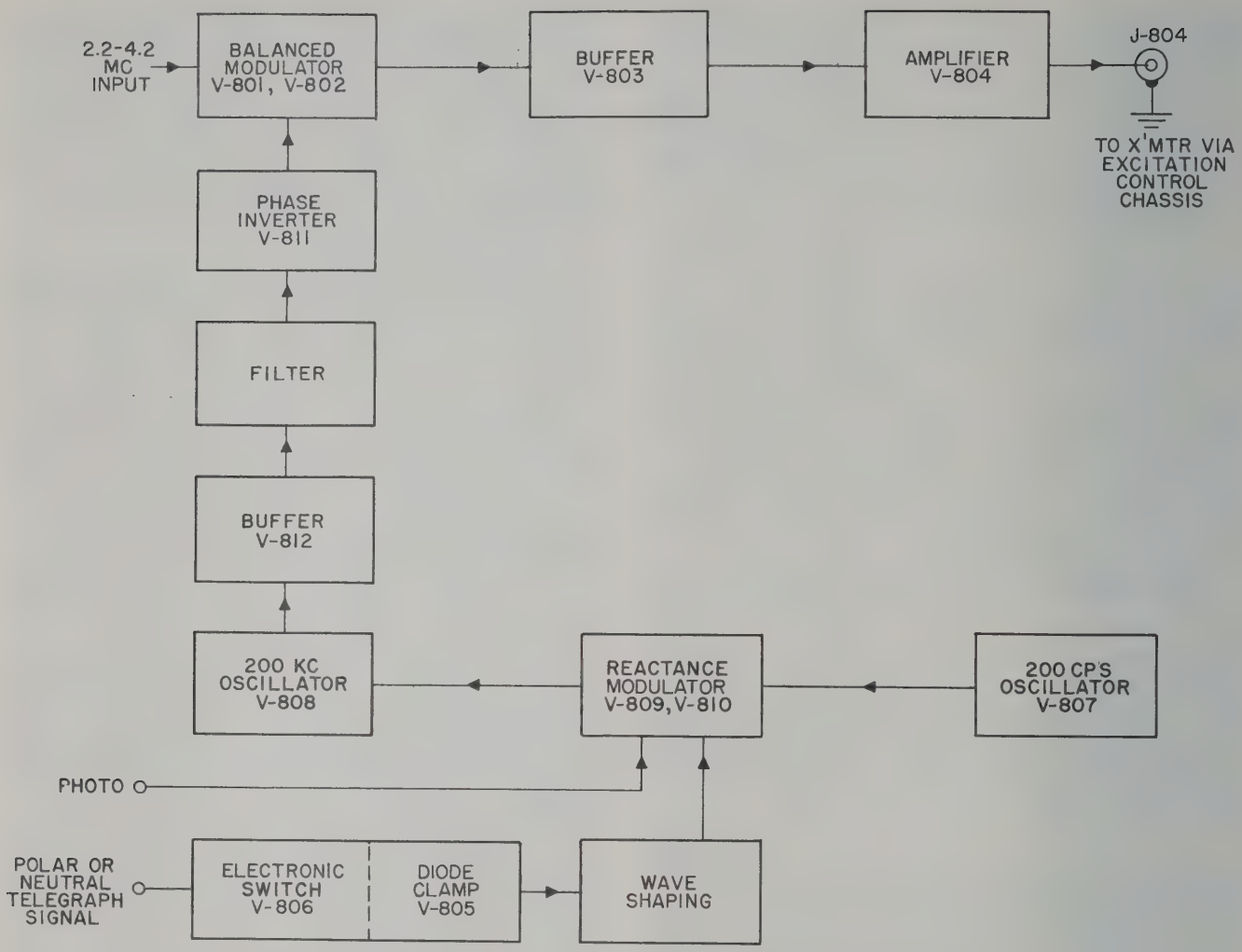


Figure 2-4. Radio Frequency Modulator MD-245/FRT-15B, Block Diagram

various combinations of four fixed capacitors C-1402 through C-1405 for the purpose of matching line impedances.

The transmitter RF output is delivered to insulated terminals E-1701, E-1703 at the top of the Radio Frequency Amplifier AM-1116/FRT-15B cabinet for connection of a balanced antenna of 70 to 800 ohms resistance and having a standing wave ratio not greater than two to one. A ground is provided (E-1702) at the output terminals for use with the antenna.

3. RADIO FREQUENCY MODULATOR MD-245/FRT-15B. *(see figure 2-4.)*

The frequency-shift circuits are incorporated in the Radio Frequency Modulator MD-245/FRT-15B. The frequency-shift keyer is ordinarily used at the transmitting station of a frequency-shift radio-telegraph circuit. Telegraph signals are generated at a control point equipped with teleprinter keyboards and tape recorder. Both the transmitting and receiving radio stations may be remote from the communication centers and they are ordinarily connected to the station by means of land lines. Figure 2-4 is a block diagram of the frequency-shift keyer circuit.

a. OPERATING FREQUENCY. — The keyer requires an injection voltage which is in the range of 2.2 mc to 4.2 mc, and 200 kc higher than the operating range. This injection voltage is mixed with a 200-kc frequency-shifted voltage from an internal source to produce an output voltage in the frequency range of 2 mc to 4 mc. The external injection voltage is ordinarily provided by either Radio Frequency Oscillator 0-317/FRT-15B or 0-324/FRT-15B, but any stable injection voltage of good wave form in the range of 2.2 mc to 4.2 mc may be used.

All plate and screen voltages supplied to the Radio Frequency Modulator are regulated and stabilized. Filament current for V-808, V-809, and V-810 is regulated by four series connected ballast tubes *(see figure 7-60.)* . The 200 kc oscillator, reactance modulator, and certain adjustable elements are enclosed in a heat-insulated, temperature controlled oven E-895. A 200 cps oscillator generates the audio signal for use in phase modulation of the FSK voltage.

b. BALANCED MODULATOR, BUFFER AND FINAL AMPLIFIER.—A radio-frequency source in the range of 2.2 mc to 4.2 mc is received at J-803 and delivered to the grids of V-801 and V-802 which constitute the balanced modulator. The number three grids of V-801 and V-802 are excited in push-pull from a 200-kc voltage derived from the frequency-shifted oscillator. Since the high frequency input is supplied to the number one grids of these tubes in identical phase, this voltage is cancelled in the output circuit because of its push-pull arrangement. Complete cancellation of this voltage occurs when the balance potentiometer R-816 is adjusted so that the transconductance of the two tubes is identical. With the high frequency input cancelled, only the mixer products remain, the most important of these being the sum and difference frequencies produced by the mixing of the high frequency signals with the 200-kc frequency-shift voltage. This keyer operates on the lower difference frequency (200 kc below the injected signal) which is selected by the four gang-tuned circuits associated with the RF TUNING control. These gang-tuned circuits include the modulator plate circuit (L-802), buffer grid (L-806), the power amplifier grid (L-807), and the power amplifier plate circuit (L-811). These four circuits are provided with inductive and capacitive trimming to make possible exact tracking throughout the 2-mc to 4-mc operating range. Because the tubes used in the buffer-amplifier and the final amplifier have effective screen grids, neutralization is unnecessary. A meter switch, S-802, provides a convenient means of measuring the grid and plate currents of the final amplifier.

c. BUFFER, 200-KC FILTER AND PHASE INVERTER.—Because harmonics of the 200-kc oscillator fall within the pass-band of the high frequency circuits of this keyer, these harmonics must be suppressed to eliminate spurious output. This is done with a low-pass filter consisting of C-848, C-849, C-850, L-818 and L-819. This filter passes the fundamental with very little attenuation but offers a high degree of rejection in the second and higher harmonics of the 200-kc oscillator. The phase inverter tube V-811 serves to produce push-pull 200-kc voltage for application on the number three grids of the balanced modulator tubes. This phase inverter employs a twin triode to secure the push-pull output voltages.

d. 200-KC OSCILLATOR AND REACTANCE MODULATOR *(see figure 2-5.)* .—The 200 kc oscillator uses a type 6AU6 tube V-808 in a tuned grid circuit. The grid circuit is shunted by the reactance tubes V-809, and V-810. Fine tuning capacitors C-844 through C-847 *(figure 7-60.)* are individually selected by the position of the rotor arm in S-804B to balance the stray and real capacitive reactance associated with the selected reactance system attenuator R-849, R-851, R-852, R-853.

The mutual conductance of V-809 and V-810 varies in response to the level of DC voltage applied at their number one grids. AC BALANCE control R-857 balances the ac components on the grids of V-809 and V-810 during the condition of no applied signal.

The output is balanced when the out-of-phase currents in V-809 and V-810 cancel one another. Resultant output signals during operation are actually controlled variations of inductive and capacitive reactance that are applied to the tuned grid circuit of the oscillator V-808. In response to this resistance modulating effect in the tuned grid circuit, the oscillator output is shifted over a predetermined frequency range.

When straight through multiplication is used in the transmitter section, this frequency shift may be set, for a maximum deviation of approximately ±1000 cps with respect to the 200 kc oscillator output. For two, four, or eight times multiplication, switch S-804 is positioned by stepper S-808 to the appropriate contact *(figure 2-5.)* for series insertion of one or more resistors (R-853, R-852, R-851) and the shunt addition of one of the capacitors C-847, C-846, C-845, or C-844.

Resonance in the plate circuit of V-809 and V-810 is effected by C-859 which is adjusted to compensate for the distributed and stray capacities of the balanced reactance modulator tubes. Because of slight differences that may exist in the gain characteristics of V-809 and V-810, a balancing control R-899 *(figure 2-5.)* is provided to equalize the output of each tube. Adjustment of the 200 kc oscillator is possible through C-861. However, because of the temperature-controlled oven and the inherent stability of the circuit, operation of this control is unnecessary for extended periods of time. The input circuits to the number one grids of V-809 and V-810 are arranged for handling of polar or neutral telegraph signals, photo signals, and phase modu-

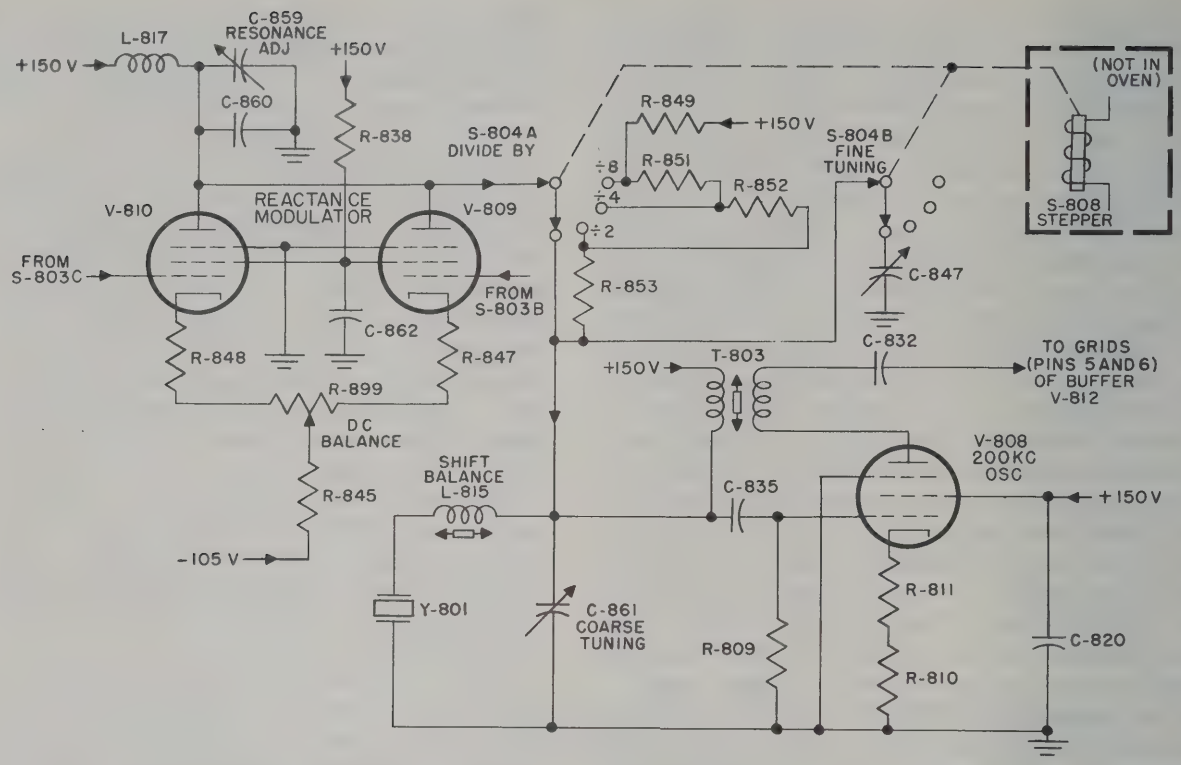


Figure 2-5. Balanced Reactance Modulator and 200 Kc Oscillator, Simplified Schematic

lation intelligence. Selection of either the telegraph or photo signal for grid excitation of the reactance modulator is made by function switch S-803. On-off operation of the phase modulation oscillator V-807 *(figure 7-60.)* is made by S-807. When phase-modulated frequency shift keying is set up, the FSK signal is applied to the number one grid of V-810 while the phase modulation signal is applied to the number one grid of V-809. When phototransmission frequency-shift keying is set-up, the photo signal is applied to the number one grid of V-809. Since phase modulation is not provided in this mode, tube V-810 is not excited by an alternating signal.

e. PHOTO INPUT *(see figure 2-6.)* .—Photo input signals of from 1 to 20 volts peak are received at J-806. When the function switch S-803 is set at PHOTO, the incoming signal is taken from R-846 where it is attenuated to a level that will put a maximum signal of one volt on the grid of V-809. The signal is passed to the DEVIATION control R-890, through S-803B, to an isolation filter consisting of C-842, R-844, C-843, and R-841. The photo signal is then impressed on the number one grid of V-809. A positive DC voltage taken across the divider R-806, R-850 is applied through S-803C (when in PHOTO position) directly to the grid of V-810 to offset (reduce) the tuned grid of V-808 to a maximum of 1000 cps below 200 kc CW. When reactance tube V-810 is excited by a positive photo input signal, inductive reactance is added to the tuned grid of V-808 resulting in an increase of oscillator frequency until a maximum deviation of plus 1000 cps above the 200 kc CW is reached.

f. TELEGRAPH INPUT.—Polar or neutral keyed signals are received at J-806 *(figure 7-60.)* With no signal, or a negative signal (space condition) applied at the grid of V-810, the 200 kc CW is reduced by approximately 500 cps at the mixing point between T-803 (sec.), L-815, and C-835. Application of a positive voltage (mark) causes the reactance modulator circuit to swing inductive and results in an increase of oscillator frequency. A simplified schematic *(figure 2-7.)* routes the path taken by the mark or space signals in polar or neutral key. The clamping diode V-805 limits the maximum level of the exciting voltage applied to V-810. Space adjust control R-839 is used to produce the desired offset of the shift from the CW. A wave shaping filter Z-803 rounds the corners off the otherwise square wave developed in V-806. This is to prevent the introduction of side tones resulting in the transmitter section from steep waves.

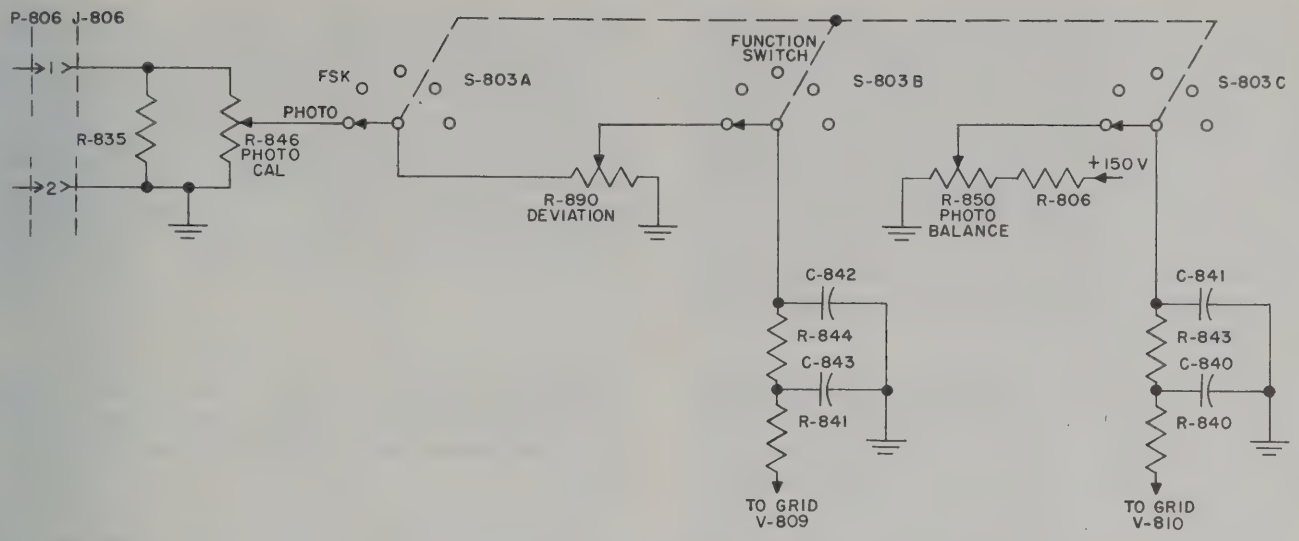


Figure 2-6. Phototransmission Input Circuit, Simplified Schematic

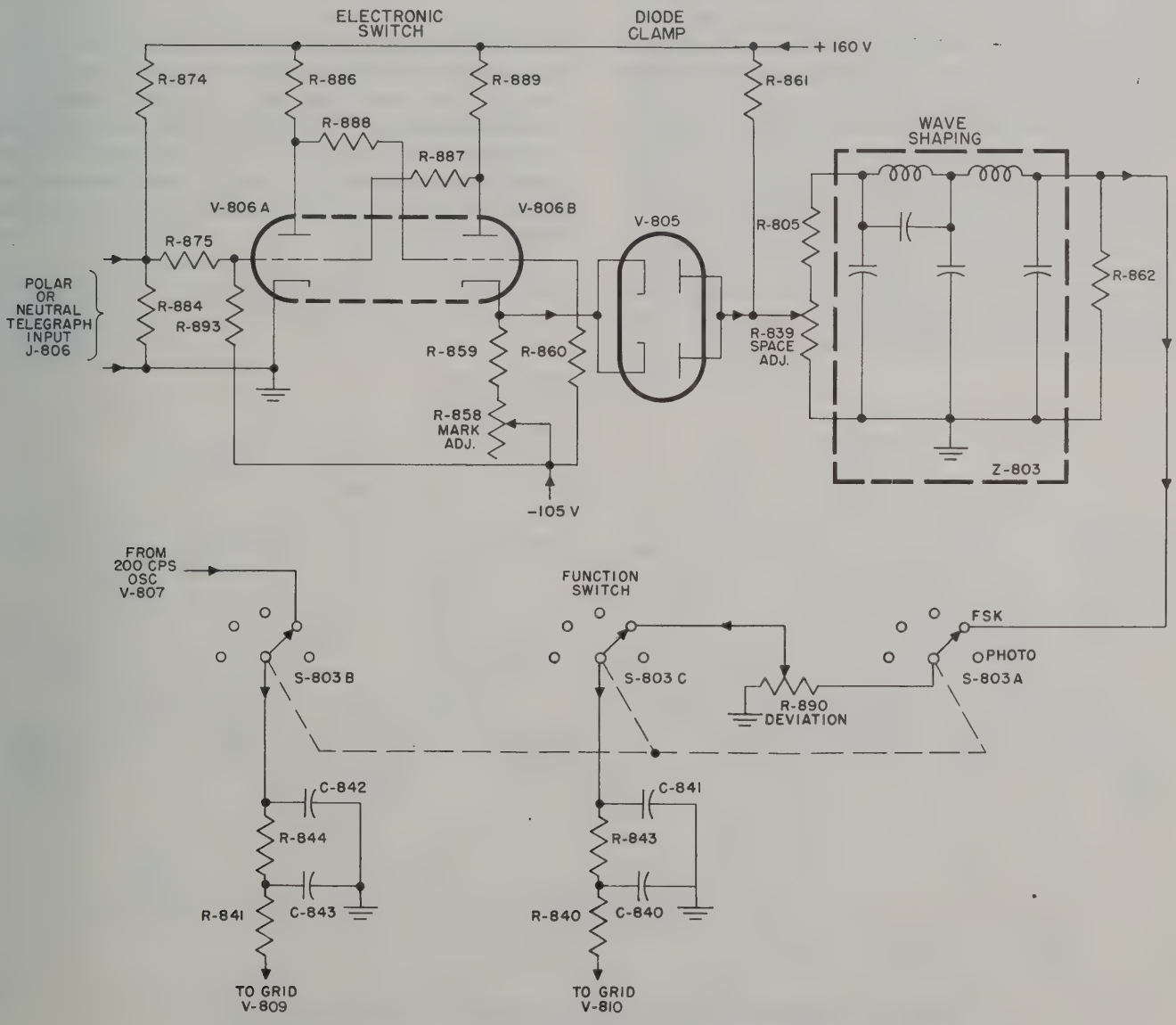


Figure 2-7. Telegraph Signal Input Circuit, Simplified Schematic

g. PHASE MODULATION.—A type 6AU6 tube V-807 *(figure 7-60.)* is employed in a conventional three mesh resistance-capacitance phase-shift oscillator circuit to produce the 200 cps signal that is impressed on the grid of V-810 during telegraph phase-modulated FSK operation. Slight adjustment of the oscillator audio frequency can be made by R-868. Switch S-807 is at one end of the output level PHASE MODULATION. Coil L-812 chokes out RF from reaching the audio oscillator.

h. AUTOTUNE CONTROL.— Channel information from the channel repeater S-712 *(figure 2-18.)* is received at the control unit 0-809. Autotune drive motor B-801 drives the RF TUNING autotune head 0-808 through the line shaft. When the control unit 0-809 (also driven off the line shaft) reaches the channel position (ground contact completed through S-712), power is automatically reversed to B-801 to return the line shaft to its original setting. The five sections of C-805 having been driven by the output shaft of autotune head 0-808 are now positioned to the proper points for RF tracking in the balanced modulators, buffer, and final amplifier stages.

Because the amount of frequency-shift that is present in the transmitter section is dependent upon the value of multiplication to which the output of the Radio Frequency Modulator MD-245/FRT-15B is subjected, a means of dividing the deviation is incorporated in the FSK circuit (refer to S-804, figure 2-5). Operation of this switch is controlled by stepper S-808 which receives band information from the power amplifier grid switch S-1324 *(figure 2-18.)*. Selector switch S-804 provides for full shift (straight through multiplication), one-half shift, one-quarter shift, and one-eighth shift.

4. AUDIO CIRCUITS.

a. AUDIO FREQUENCY AMPLIFIER AM-1150/FRT-15B AND MODULATOR. *(see figure 7-58.)*.

(1) LOCAL-REMOTE CONTROL. — With the LOCAL-REMOTE switch S-303 in the LOCAL position, the local microphone is connected to the input of the speech amplifier stage through the MCW relay K-301 in the de-energized position. When S-303 is in the REMOTE position, audio output from the amplifier in Transmitter Control C-1501/FRT-15B is applied to the speech amplifier. When MCW relay K-301 is in the energized position, the audio oscillator V-308 output is connected to the input T-301 of the speech amplifier.

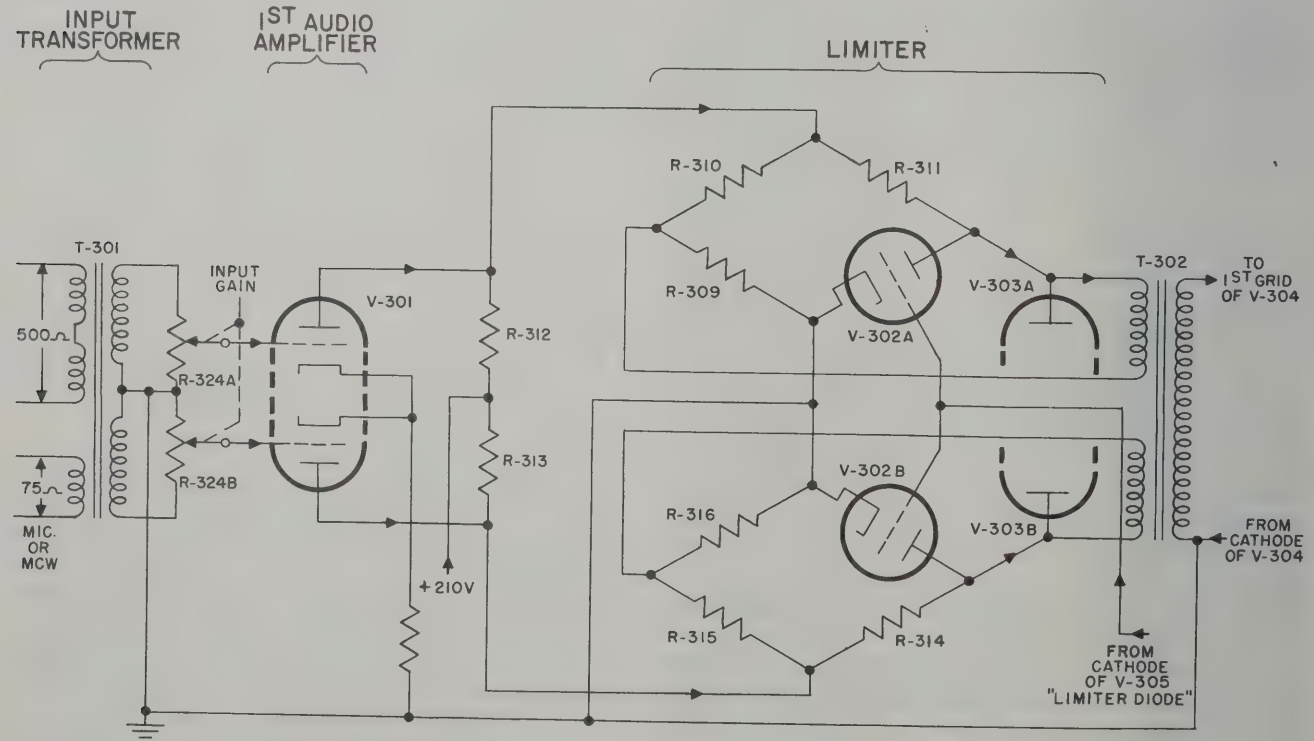


Figure 2-8. First Audio Amplifier and Limiter Bridge, Simplified Schematic

(2) AUDIO (MCW) OSCILLATOR. — The audio oscillator utilizes a type 6SN7 dual-triode tube V-308. One half of V-308 is in the oscillator circuit consisting of L-301, C-310A and B, with coupling capacitors C-302 and C-303. The oscillator output is coupled by C-304 to the grid of the second half of V-308. Oscillator output voltage is taken across R-325, the MCW GAIN control. Output from the second half of V-308 is taken from the cathode.

(3) AUDIO AMPLIFIER *(see figure 2-8.)* .— Speech or audio tone input to the audio amplifier V-301 is coupled through input transformer T-301. Audio amplifier V-301 is connected in a balanced class A circuit. INPUT GAIN control, a dual potentiometer R-324, is used to adjust the input to the grids of V-301 and the balanced output from the plates is passed on to the limiter and squelch stage.

(4) AUDIO LIMITER AND SQUELCH *(see figure 2-9.)*.—The volumn limiter that is incorporated in this equipment has been designed to control the audio signal level and to give uniform speech-amplifier output with a relatively wide variation of audio input. When the limiter control is properly adjusted, increasing the input to the preamplifier as much as 25 db will cause a rise in the speech amplifier output which will not exceed 3 db. The limiter circuit utilizes the principle of the familiar Wheatstone resistance bridge.

The limiter circuit employs two type 6C8G twin triodes (V-302 and V-303), and a type 6X5GT full-wave rectifier (V-305). The two type 6C8G tubes are connected in a double resistance bridge circuit with the triode sections of V-302 and V-303 acting as the variable legs of the bridges. One bridge circuit consists of resistors R-309, R-310, R-311 and a variable leg consisting of two triodes, one section of V-302 and one section of V-303 both connected in parallel. The second bridge circuit consists of resistors R-314, R-315, and R-316, and the remaining triode sections of the two 6C8G tubes. When the value of R-309 x R-311 = R-310 x (the plate resistances of V-302A and V-303A, the variable leg of the bridge), and the value of R-314 x R-316 = R-315 x (the plate resistance of the other variable leg, V-302B and V-303B in the second bridge), the loss across the combined bridge circuits will be very high and only a very small portion of the output from V-301 will be permitted to reach the primary winding of the interstage coupling transformer T-302. If, however, the resistance of one leg of the bridge is very high compared to the other three legs, the bridge will be unbalanced and the loss in the circuit will be small.

Tube V-303 has been connected in the circuit to protect the modulator tubes V-309, V-310 during the time that the transmitter is in the stand-by condition, that is, with filament and plate voltages on, but with the microphone push-to-talk button released, the telegraph key open

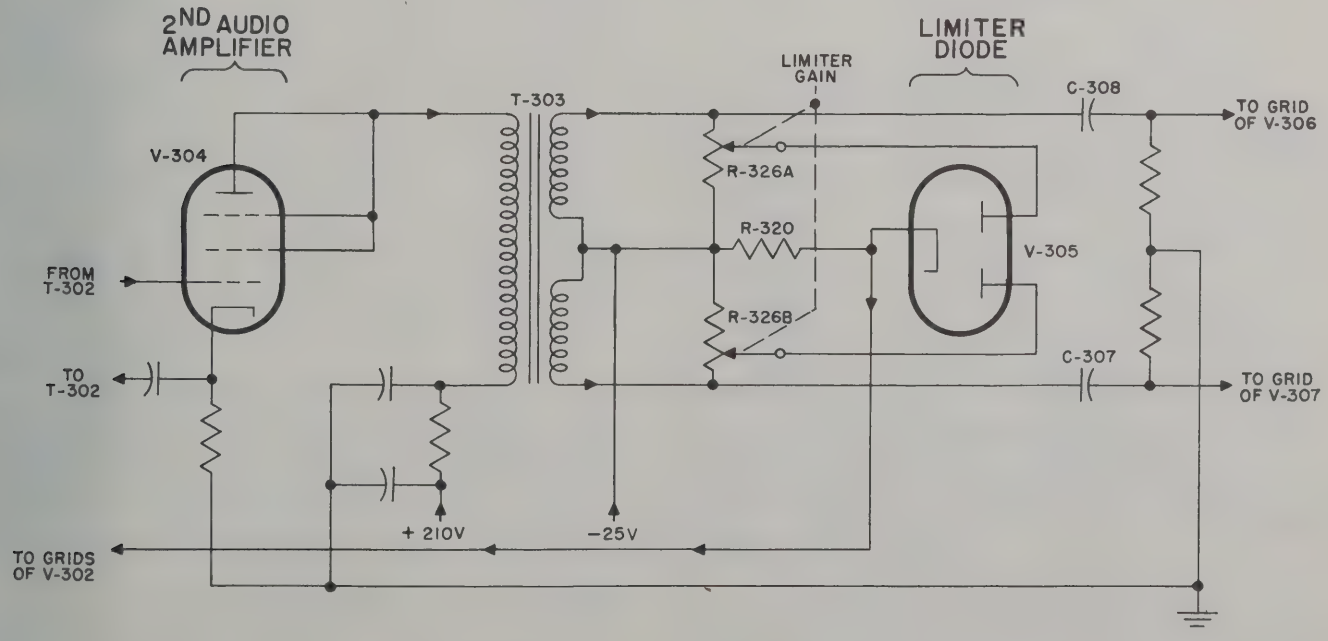


Figure 2-9. Second Audio Amplifier and Limiter Diode, Simplified Schematic

and the carrier key switch S-301 in the off-position. During the time that the r-f carrier is off, V-303 is in the conducting condition, resulting in a comparatively low value of plate resistance. With zero audio input, the bias on the grids of V-302 is approximately -25 volts, resulting in a high value of plate resistance. With one triode section of V-302 connected in parallel with a triode section of V-303 the resistance of the variable bridge leg will be less than the plate resistance of the tube with the lower plate resistance. Under these conditions, the resistance of the variable leg will be less than the plate resistance of V-303 and will be near the value necessary to balance the bridges. When the bridges are balanced, very little voltage will appear across the windings of transformer T-302 and the modulator tubes will be protected from damage as a result of driving the grids when the class C load is removed.

When the r-f carrier is turned on by operating the carrier key switch, telegraph key, or the push-to-talk button on the microphone, a fixed bias is applied to the grid of V-303 so that plate current is cut off and the plate resistance of the tube becomes very high to unbalance the bridges and permit the output of V-301 to appear across the primary of transformer T-302. The output of V-301 drives the grid of the triode connected type 6SJ7 audio amplifier V-304. The output of V-304 is coupled to the grids of the push-pull audio driver stage by transformer T-303. The limiter control tube V-305 is connected across the secondary of transformer T-303. The voltage that is applied to the plates of V-305 may be varied by the adjustment of LIMITER GAIN R-326. As the level of the audio signal is increased, the voltage across the secondary of transformer T-303 increases, resulting in an increase in the amount of current in the rectifier circuit. The current through V-305 develops a voltage across resistor R-320 that varies directly with the current through the rectifier and is opposite in polarity to the fixed bias that appears across the resistor. The sum of the fixed bias voltage and the developed voltage gives a voltage that is less negative than the fixed bias applied to V-302 -- and the result is a greater current through V-302. Increasing the plate current through V-302 results in a lower plate resistance. The loss across the bridges increases rapidly as balance is approached and as a result, less voltage is permitted to reach the primary of transformer T-302. The current through V-305 and the resulting amount of compression may be regulated by adjusting R-326.

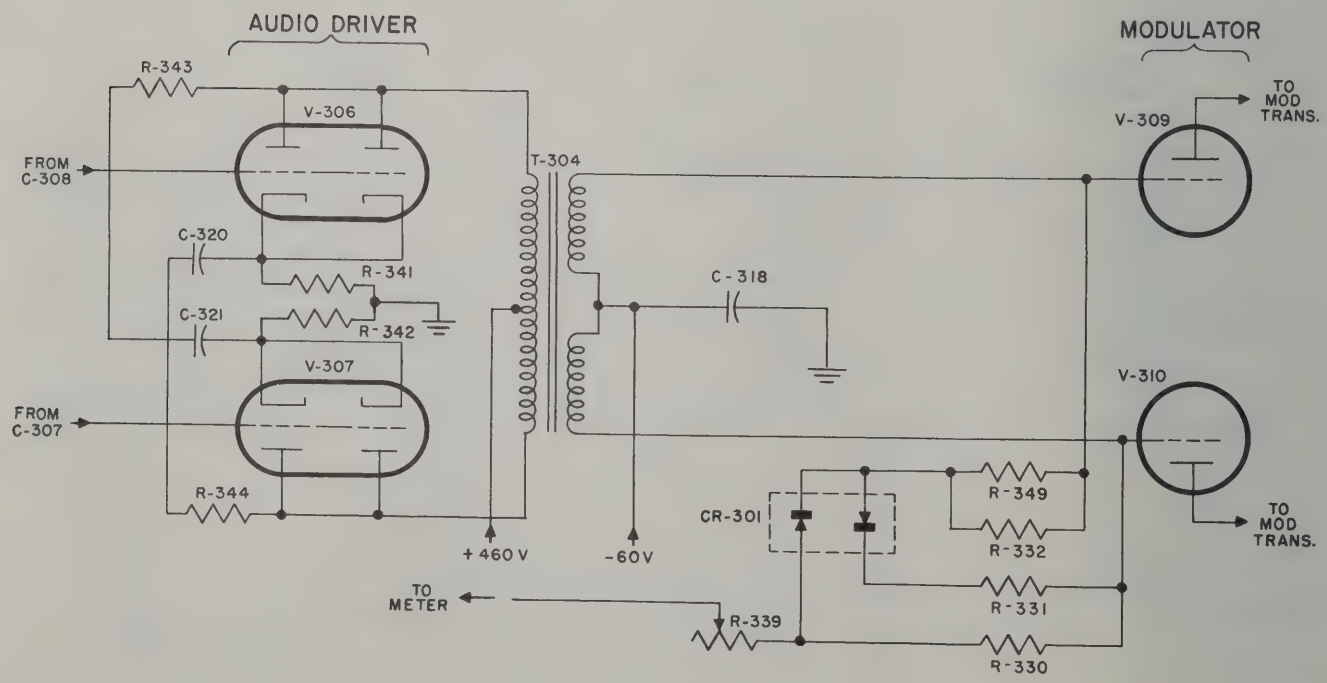


Figure 2-10. Audio Driver and Modulator Stages, Simplified Schematic

(5) AUDIO DRIVER *(see figure 2-10.)*.— Two type 6SN7 dual triode tubes connected in a push-pull output circuit are operated class A as the audio drivers. Output from these tubes V-306 and V-307 is coupled to the modulator stage by transformer T-304.

(6) MODULATOR.—Two type 4-1000/A air-cooled tetrode transmitter tubes V-309 and V-310 operating class AB, are used to plate-modulate the RF power amplifier. Audio power from transformer T-304 is applied to the grids of V-309 and V-310. Bias voltage is supplied from the Power Supply Assembly PP-1198/FRT-15B. A PERCENT MODULATION meter M-1501 operates from meter rectifier CR-301 which is connected across the grid input of the modulator to indicate the volume level for adjustment of the audio stages. The audio output of the modulator is coupled to the plate circuit of the RF power amplifier by modulation transformer T-1501, located at the base of the Modulator-Oscillator Group OA-745/FRT-15B cabinet. Plate voltage for modulator operation is obtained from the high-voltage rectifier.

b. TRANSMITTER CONTROL C-1501/FRT-15B *(see figure 7-69.)*.—This unit, including desk set and telegraph key, provides control of channel and emission selection by dialing, start-stop control and keying of the transmitter at a remote point.

A double stage audio amplifier (V-401 and V-402) is incorporated in the Transmitter Control C-1501/FRT-15B to overcome line loss between this unit and the transmitter proper. To improve the waveform at the output, degenerative feedback is employed between the plate of V-402 and the cathode of V-401.

Audio input transformer T-401 has two primaries, a 75-ohm winding for connection of the microphone and a 500-ohm center-tapped winding for connection of an audio line at terminals 14, 15, 16 on TB-401. The secondary is shunted by GAIN control R-401, which is used to set the level of the audio signal input to the grid of V-401.

VOLUME INDICATOR meter M-401 is connected directly across the secondary of T-402 to indicate the audio output level. Meter calibrate R-402 is used to adjust the setting of CHANNEL INDICATOR M-402 to agree with the selected channel of operation refer to paragraph 2.c.(2).

Power required for operation of the audio amplifiers is supplied from the stabilized and regulated power supply (excluding filament power) included in the Control Transmitter C-1501/FRT-15B chassis. Functionally, this power supply is similar to the one described in paragraph 5.b., Power Supply PP-1197/FRT-15B.

5. POWER SUPPLY CIRCUITS.

a. GENERAL.—The power supply circuits include:

(1) AC primary circuits and rectifiers in the Power Supply PP-1197/FRT-15B, Power Supply Assembly PP-1198/FRT-15B, filament supply and rectifier circuits in Control Transmitter C-1501/FRT-15B.

(2) The filament circuits in various units.

Note

AC POWER DISTRIBUTION CIRCUITS ARE PRESENTED IN FIGURE 2-11, CONTROL CIRCUITS IN FIGURE 2-12, AND POWER SUPPLY DISTRIBUTION IN FIGURE 2-13.

b. POWER SUPPLY PP-1197/FRT-15B *(see figure 7-63.)*.—To maintain frequency stability within prescribed limits, all direct current and one a-c filament supply voltage are regulated in the Radio Frequency Oscillator O-317/FRT-15B and Radio Frequency Modulator MD-245/FRT-15B units. Power Supply PP-1197/FRT-15B provides the required power outputs as listed in table 2-1.

TABLE 2-1.
PP-1197/FRT-15B POWER SUPPLY CIRCUITS

APPLIED TO	VOLTAGE	CURRENT
Plate	+ 240	220 ma, dc
	+ 160	40 ma, dc
Bias	- 105	
Filament	6.3	0.9 amps, ac

The rectified power for the first three of these four supplies is made available through two type 5R4GY tubes with plates in parallel, and a single 6X4 tube. Filament power for the regulated filament supply is taken directly from an 18 volt winding in the rectifier plate supply transformer T-1002.

(1) POSITIVE 240 AND 160 VOLT SUPPLIES.—Full-wave rectification of the induced ac in the rectifier plate supply transformer is obtained by operating one type 5R4GY tube from

each end of the transformer's secondary high-voltage winding. The output is capacitor filtered by components C-1001, C-1002, which act only to eliminate most of the a-c ripple. Bleeder resistors R-1013, R-1014 discharge the filter capacitors when the power is turned off. The negative side of the high voltage supply is returned to ground through the center tap on the high voltage winding of T-1002.

(2) VOLTAGE REGULATION, GENERAL.—The electronic voltage regulator network, which may be compared to an automatic variable resistor in series with the d-c power supply output, compensates for an increase or decrease in the output voltage. This network is composed of two supply circuits. The first circuit is a +240 volt supply circuit containing three type 6AS7G parallel connected regulator tubes; V-1005, V-1006, V-1007 and regulator control tube, V-1008. The second circuit is a +160 volt supply circuit containing a regulator tube V-1009 and regulator control tube V-1010. Voltage reference for both regulators is obtained from the regulated output of the -105 volt bias supply.

(*a*) The +240 VOLT SUPPLY.—When the common cathode-voltage of regulator tubes V-1005, V-1006, V-1007 increases, the voltage across R-1016 increases. As this occurs, a more positive voltage is applied to the first grid of V-1008. Since the cathode of V-1008 is grounded this tube will conduct a heavier current and the voltage at pin five will drop. The drop in voltage (across R-1015) is coupled to the grids of V-1005, V-1006, V-1007 through suppressor resistors R-1010, R-1011, R-1012. The resistance of these tubes is increased and this causes them to automatically produce a decrease in their common cathode voltage. If the cathode voltage should decrease, the reverse action takes place. The resistance of the regulators V-1005, V-1006, V-1007 decreases and restores the common cathode voltage to normal. Capacitor C-1007 makes V-1008 sensitive to rapid changes in the output voltage by coupling the full voltage change to the first grid. Because of the high amplification of V-1008, the output voltage is held constant over a wide range of load, or input changes. Potentiometer R-1017 is used to set the operating point of the +240 volt regulator circuit.

(*b*) THE +160 VOLT SUPPLY.—The action of the regulator tube V-1009 and its control tube V-1010 is similar to the action of regulators V-1005, V-1006, V-1007 and control tube V-1008, discussed in the preceding sub-paragraph. Potentiometer R-1024 serves to determine the operating point in the +160 volt regulator circuit.

(*c*) THE -105 VOLT SUPPLY.—The bias supply is filtered by resistors R-1001, R-1002, R-1003 and capacitors C-1003 through C-1006.

(*d*) THE 6.3 VOLT AC SUPPLY.— A constant current is maintained at the filament source in the Radio Frequency Oscillator O-317/FRT-15B and Radio Frequency Modulator MD-245/FRT-15B (frequency shift keyer) units by four, parallel connected series inserted Amperite tubes which function as variable resistance elements. An increase in supply voltage causes additional current to flow through the iron wire in each ballast tube. As a result, the heat in the wire is increased, causing the resistance to increase and the current to decrease almost to the initial value. Variable resistor R-1027 is adjusted until the required 6.3 volts is obtained.

(3) MONITORING.—A 0 to 300 volt, direct reading meter M-1001 is used to monitor the voltage potential in the +240, +160, and -105 power supply output lines. All voltages are measured to chassis ground. Selection of the supply circuit to be monitored is accomplished by operation of switch S-1002, mounted on the front panel.

c. POWER SUPPLY ASSEMBLY PP-1198/FRT-15B *(see figure 7-64.)*.

(1) HIGH VOLTAGE RECTIFIER *(see figure 2-14)*.—The high voltage (4.2 KV) power supply is a delta-wye connected three-phase full wave choke input rectifier circuit consisting of transformer T-1603 and six type 4B32 Xenon filled rectifier tubes, V-536 through V-541. The filter circuit is a single "L" section comprising L-501 and C-1601. KV meter, M-1502, continuously monitors the level of the dc potential above chassis ground. Resistors R-530, R-531, R-532 are dropping resistors for the KV meter. Bleeders R-533, R-534 are grounded through the coil of relay K-501. While the high-voltage rectifiers are functioning properly, the contacts of K-501 are closed and the return side of the bias power supply is grounded. When a fault causes the high voltage to fail, K-501 opens and in so doing, shuts off the bias power supply. Overload protection is afforded to the high-voltage circuit by K-510, which operates to open the interlock circuit. Shunt R-556 is adjusted to the point where any further increase in the current will cause K-510 to operate. Test jacks J-501, J-502 are provided for measurement of the AC rectifier filament voltage in the secondary of T-501 and T-502.

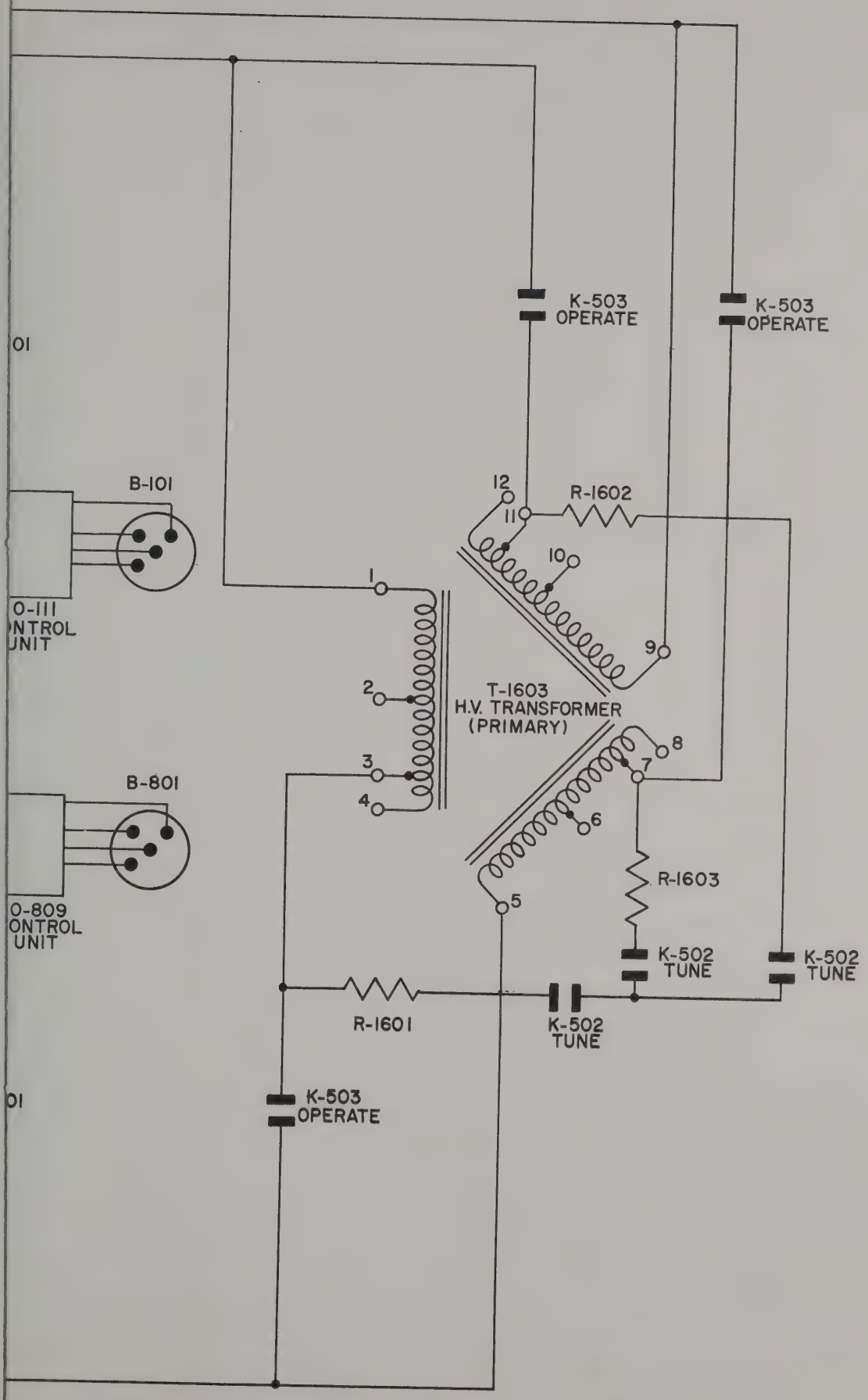


Figure 2-11. AC Primary Circuits, Radio Transmitting Set AN/FRT-15B

each end of the transformer's secondary high-voltage winding. The output is capacitor filtered by components C-1001, C-1002, which act only to eliminate most of the a-c ripple. Bleeder resistors R-1013, R-1014 discharge the filter capacitors when the power is turned off. The negative side of the high voltage supply is returned to ground through the center tap on the high voltage winding of T-1002.

(2) VOLTAGE REGULATION, GENERAL.—The electronic voltage regulator network, which may be compared to an automatic variable resistor in series with the d-c power supply output, compensates for an increase or decrease in the output voltage. This network is composed of two supply circuits. The first circuit is a +240 volt supply circuit containing three type 6AS7G parallel connected regulator tubes; V-1005, V-1006, V-1007 and regulator control tube, V-1008. The second circuit is a +160 volt supply circuit containing a regulator tube V-1009 and regulator control tube V-1010. Voltage reference for both regulators is obtained from the regulated output of the -105 volt bias supply.

(*a*) The +240 VOLT SUPPLY.—When the common cathode-voltage of regulator tubes V-1005, V-1006, V-1007 increases, the voltage across R-1016 increases. As this occurs, a more positive voltage is applied to the first grid of V-1008. Since the cathode of V-1008 is grounded this tube will conduct a heavier current and the voltage at pin five will drop. The drop in voltage (across R-1015) is coupled to the grids of V-1005, V-1006, V-1007 through suppressor resistors R-1010, R-1011, R-1012. The resistance of these tubes is increased and this causes them to automatically produce a decrease in their common cathode voltage. If the cathode voltage should decrease, the reverse action takes place. The resistance of the regulators V-1005, V-1006, V-1007 decreases and restores the common cathode voltage to normal. Capacitor C-1007 makes V-1008 sensitive to rapid changes in the output voltage by coupling the full voltage change to the first grid. Because of the high amplification of V-1008, the output voltage is held constant over a wide range of load, or input changes. Potentiometer R-1017 is used to set the operating point of the +240 volt regulator circuit.

(*b*) THE +160 VOLT SUPPLY.—The action of the regulator tube V-1009 and its control tube V-1010 is similar to the action of regulators V-1005, V-1006, V-1007 and control tube V-1008, discussed in the preceding sub-paragraph. Potentiometer R-1024 serves to determine the operating point in the +160 volt regulator circuit.

(*c*) THE -105 VOLT SUPPLY.—The bias supply is filtered by resistors R-1001, R-1002, R-1003 and capacitors C-1003 through C-1006.

(*d*) THE 6.3 VOLT AC SUPPLY.—A constant current is maintained at the filament source in the Radio Frequency Oscillator O-317/FRT-15B and Radio Frequency Modulator MD-245/FRT-15B (frequency shift keyer) units by four, parallel connected series inserted Amperite tubes which function as variable resistance elements. An increase in supply voltage causes additional current to flow through the iron wire in each ballast tube. As a result, the heat in the wire is increased, causing the resistance to increase and the current to decrease almost to the initial value. Variable resistor R-1027 is adjusted until the required 6.3 volts is obtained.

(3) MONITORING.—A 0 to 300 volt, direct reading meter M-1001 is used to monitor the voltage potential in the +240, +160, and -105 power supply output lines. All voltages are measured to chassis ground. Selection of the supply circuit to be monitored is accomplished by operation of switch S-1002, mounted on the front panel.

c. POWER SUPPLY ASSEMBLY PP-1198/FRT-15B *(see figure 7-64.)*.

(1) HIGH VOLTAGE RECTIFIER *(see figure 2-14)*.—The high voltage (4.2 KV) power supply is a delta-wye connected three-phase full wave choke input rectifier circuit consisting of transformer T-1603 and six type 4B32 Xenon filled rectifier tubes, V-536 through V-541. The filter circuit is a single "L" section comprising L-501 and C-1601. KV meter, M-1502, continuously monitors the level of the dc potential above chassis ground. Resistors R-530, R-531, R-532 are dropping resistors for the KV meter. Bleeders R-533, R-534 are grounded through the coil of relay K-501. While the high-voltage rectifiers are functioning properly, the contacts of K-501 are closed and the return side of the bias power supply is grounded. When a fault causes the high voltage to fail, K-501 opens and in so doing, shuts off the bias power supply. Overload protection is afforded to the high-voltage circuit by K-510, which operates to open the interlock circuit. Shunt R-556 is adjusted to the point where any further increase in the current will cause K-510 to operate. Test jacks J-501, J-502 are provided for measurement of the AC rectifier filament voltage in the secondary of T-501 and T-502.

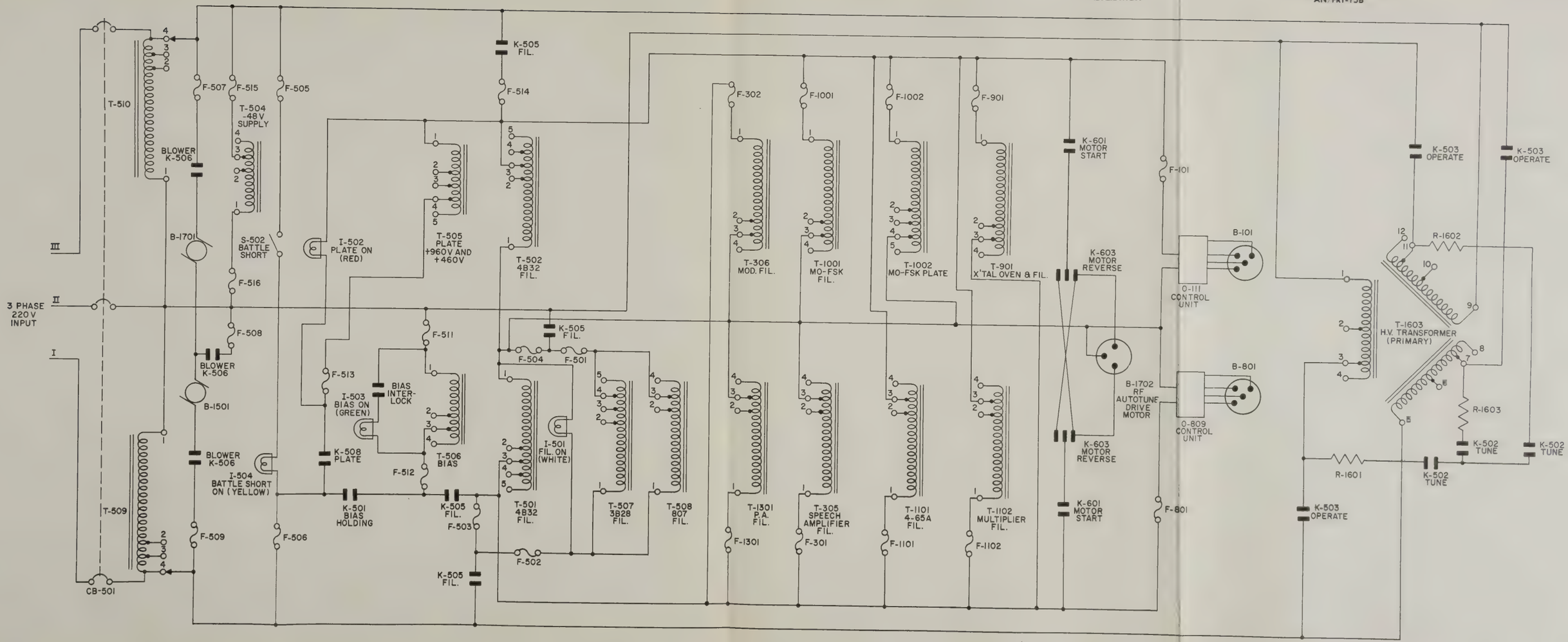


Figure 2-11. AC Primary Circuits, Radio Transmitting Set AN/FRT-15B

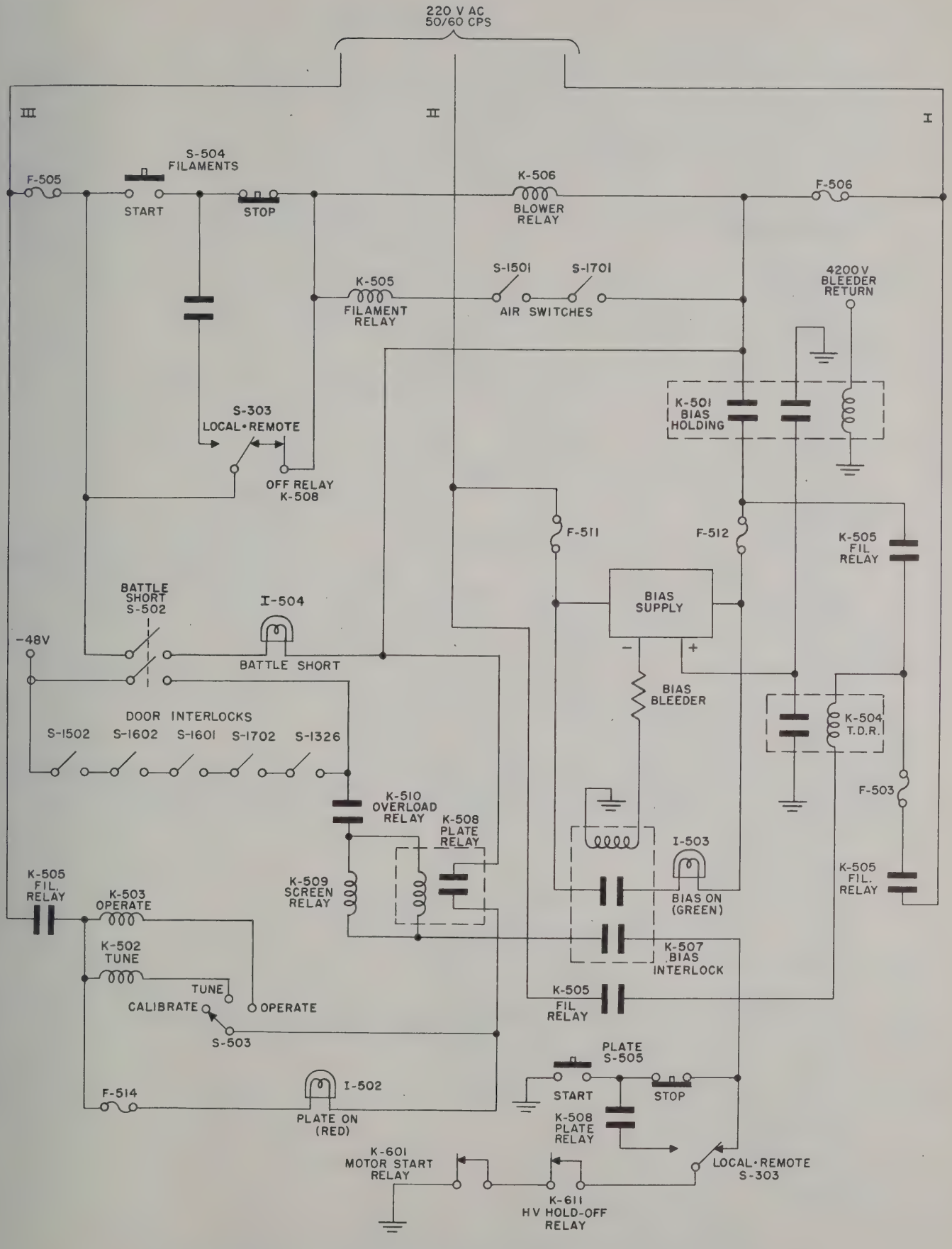


Figure 2-12. Power Control Circuits, Radio Transmitting Set AN/FRT-15B

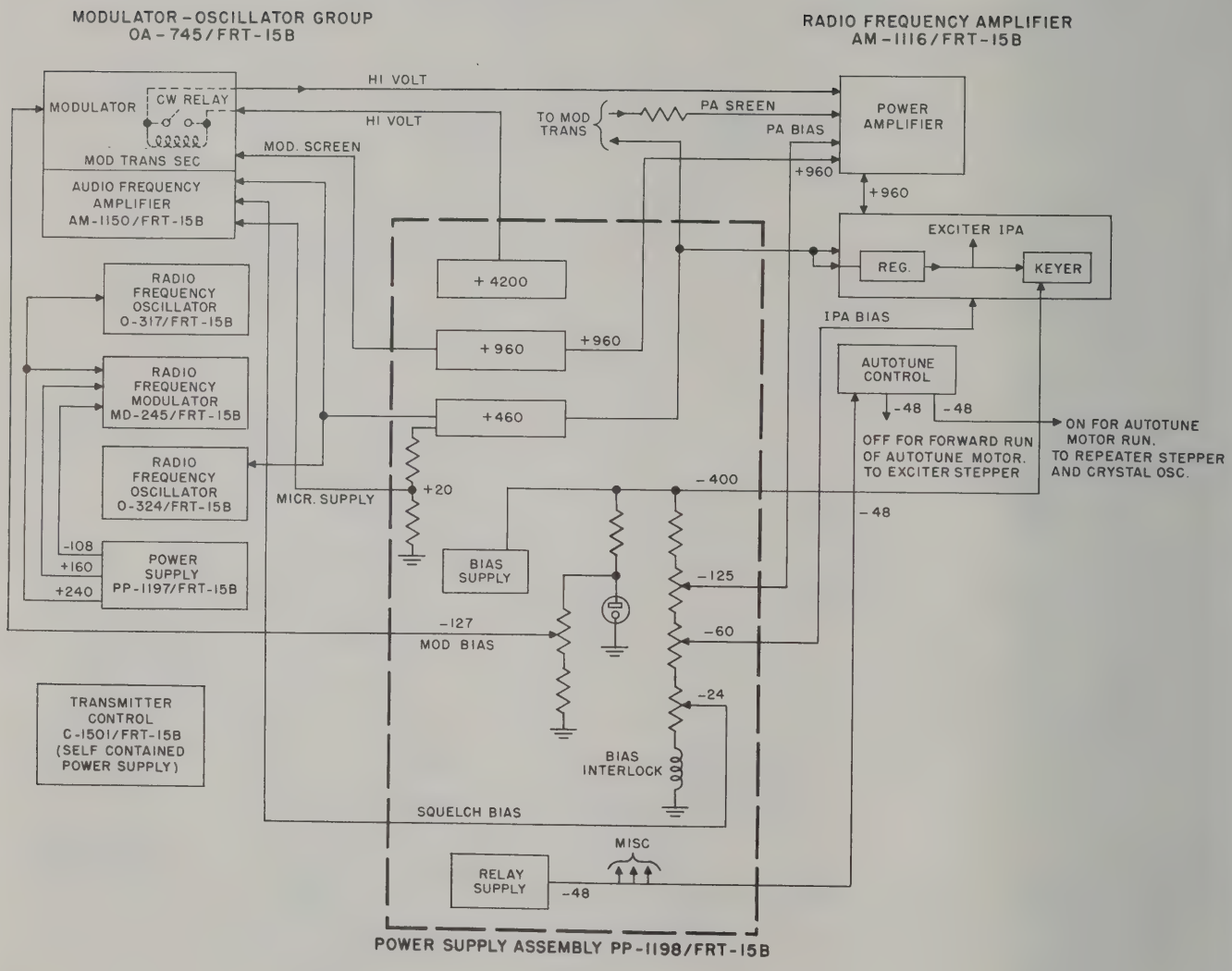


Figure 2-13. Power Supply Distribution in Radio Transmitting Set AN/FRT-15B

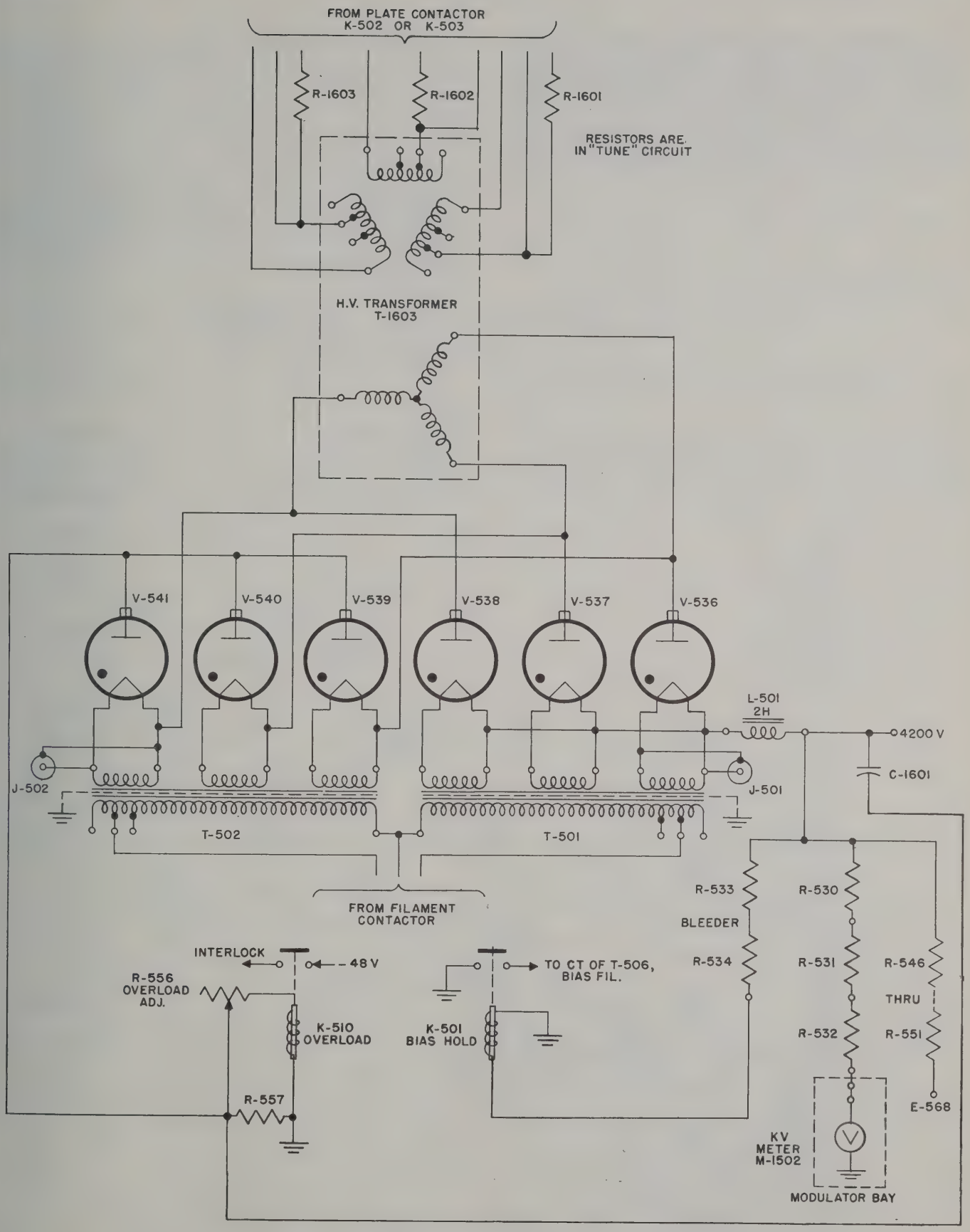


Figure 2-14. High Voltage Rectifier Supply, Simplified Schematic

A TUNE - OPERATE switch, located on the front panel of the bay, switches the primaries of the three single-phase high voltage windings from a delta - connection to a star ("Y") connection. Delta - connected, it furnishes 4,000 V dc and Y- connected, delivers approximately 2,000 V dc for use in the tuning operation.

(2) LOW VOLTAGE RECTIFIER *(see figure 2-15.)* —Four type 3B28 rectifier, Xenon filled tubes are employed in two separate rectified-output circuits. One of these circuits supplies a regulated output of +960 V dc. The second supply furnishes a two section, choke input, filtered output of +460 V dc and +20 V dc. A divider, R-536, R-537 is used to obtain the + 20 V dc output. An electronic voltage regulator network similar to the one described in paragraph 5.b.(2) is employed.

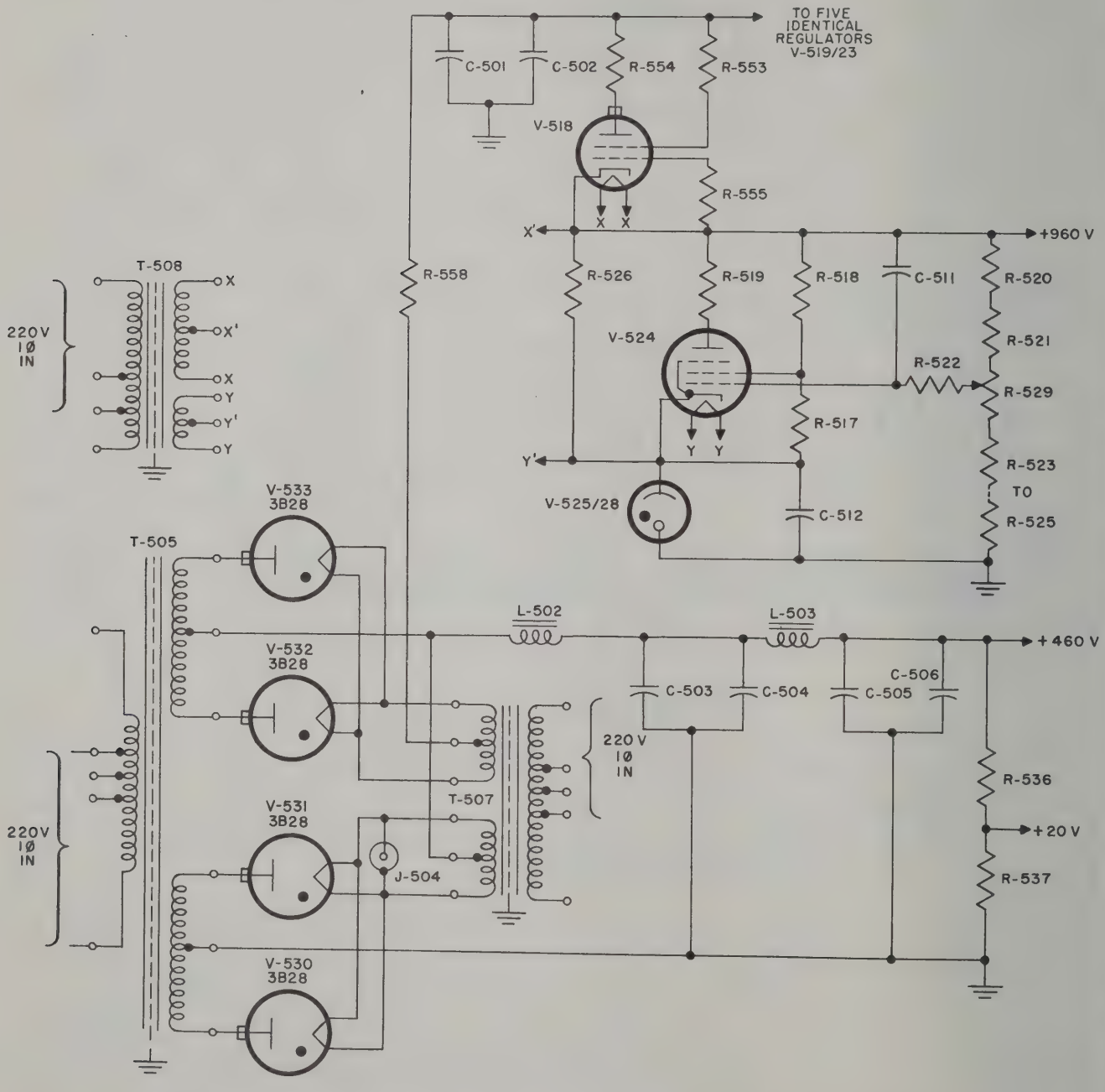


Figure 2-15. Low Voltage Rectifier and Regulator Power Supply, Simplified Schematic

(3) BIAS *(see figure 2-16.)* .—The bias supply furnishes the following output voltages:

(a) -360V
(b) -127V, regulated
(c) -124V
(d) -60V
(e) -24V

The divider chain is terminated to chassis ground through the coil of relay K-507. Relay K-507 functions to open the interlock circuit in the event of a failure in the bias supply circuit. A two section choke input filter is employed to filter all levels of bias voltages. The regulated -127 V dc is made available across the regulator tube V-529 at potentiometer R-528. Test jack J-503 provides access for measurement of the filament voltage at the AC rectifier.

d. PRIMARY AND POWER CONTROL CIRCUITS (See figures 2-11, 2-12).—The transmitter contains all necessary equipment to provide required operating voltages from a nominal 220 volt, three phase, 50 to 60 cycle supply fed in at terminals 5, 6, and 7 of TB-501 in the Power Supply Assembly PP-1198/FRT-15B. MAIN CIRCUIT BREAKER CB-501 controls application of all power to the autotransformers T-509 and T-510. Power output from T-509, T-510 is supplied to the following:

(1) The primary of the -48 volt rectifier (CR-501) transformer T-504.

(2) Cabinet and components blower motors B-1501 and B-1701 through the contacts of the blower relay K-506.

(3) A source of single phase power is available at pin 34 of TB-509 *(figure 7-64.)*.

(4) To the FILAMENT ON switch, which when in the ON position, closes the circuit to the blower relay K-506, the air switches S-1501 and S-1701 and the filament contactor K-505.

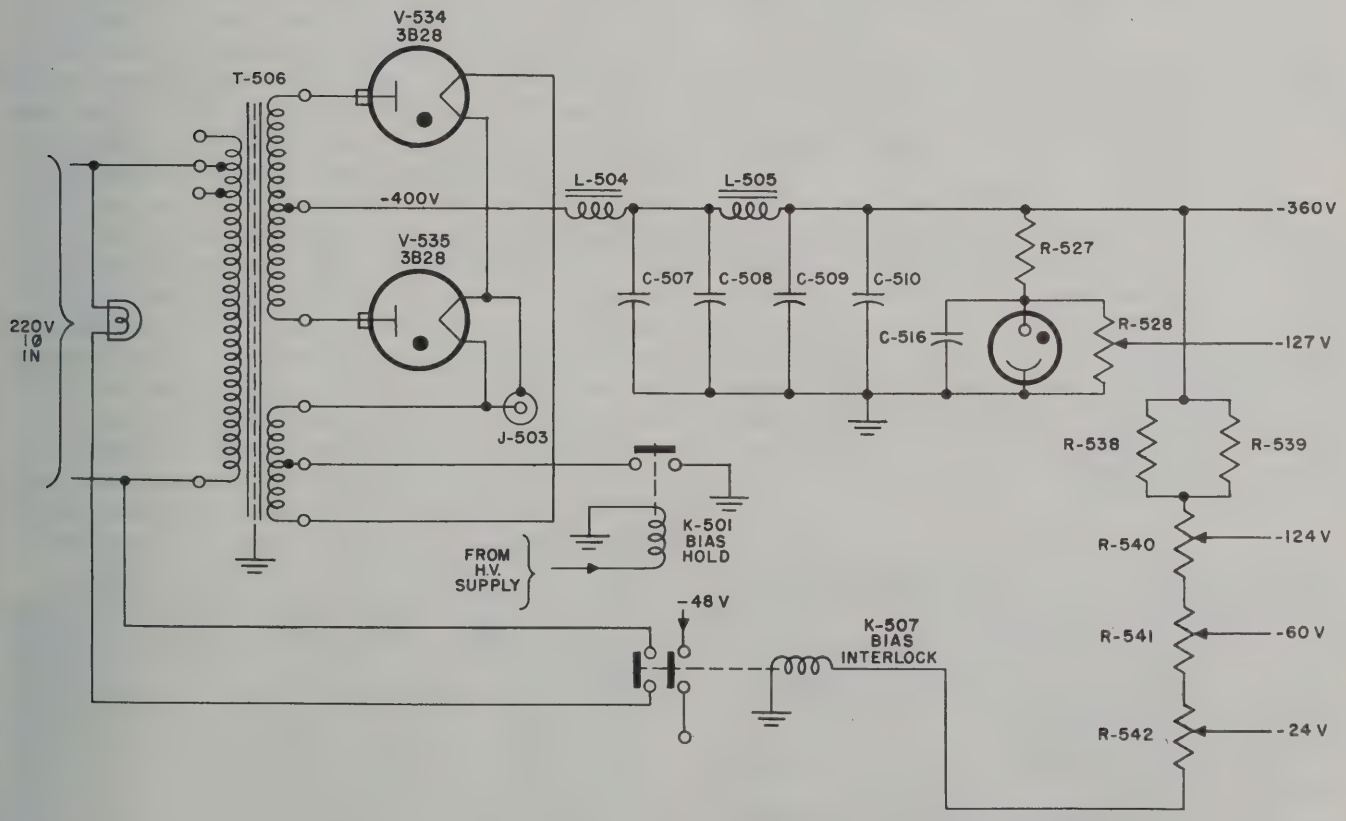


Figure 2-16. Bias Voltage Rectifier and Regulator Power Supply, Simplified Schematic

Closing of the filament contactor permits application of power to the time delay relay K-504 which upon completion of its cycle grounds the center tap of the bias supply rectifier filament winding in T-506. Bias output voltage energizes the bias interlock K-507 and in so doing closes the circuit to the PLATE ON switch S-505. Provided all door interlocks and the thermal overload radiation type cut-out switch in the Power Amplifier are closed, -48 volt d-c power is available through the normally closed contacts of the high-voltage overload cut-out relay K-510 to operate the screen relay K-509 and the plate relay K-508. Operation of K-508 permits the application of single phase power to T-505 in the plate and screen supply, and also to either K-502 or K-503 contactors---dependent upon the position of the PA PLATE VOLTAGE switch S-501. Operation of S-501 to either the TUNE or the OPERATE position causes K-502 or K-503 to become energized. The closing of either of these contactors completes the three phase supply circuit from the autotransformers T-509, T-510 to the high-voltage plate transformer T-1603. In the "Tune" position, the contactors connect the high voltage transformer primaries in a star ("Y") connection to provide approximately 2,000 V dc. In "OPERATE", the contactors switch the primary connection to a delta-connected winding to furnish 4,000 V dc. high-voltage potential, which is desirable for purposes of tuning.

(5) The BATTLE SHORT switch S-502 is shunted across the door interlock switches S-1502, S-1601, S-1602, S-1702, and the thermal overload radiation type switch S-1326. Maintenance of the transmitter sections can be effected with all power on and any one or all of the interlocks opened whenever the BATTLE SHORT switch is closed. The BATTLE SHORT yellow color indicator lamp I-504 should illuminate when the switch S-502 is ON.

(6) Note in figure 2-12 that when the filament contactor K-505 is closed, power is available to the following major components:

(*a*) T-506, bias rectifier transformer

(*b*) T-501 and T-502, high voltage rectifier filament transformers

(*c*) T-507, plate and screen rectifier filament transformer

(*d*) T-508, plate and screen series regulators and control amplifier filament transformer

(*e*) T-1301, power amplifier filament transformer

(*f*) T-306, modulator filament transformer

(*g*) T-305, filament transformer in the Audio Frequency Amplifier AM-1150/FRT-15B

(*h*) T-1001, filament transformer in the Power Supply PP-1197/FRT-15B

(*i*) T-1101, filament transformer for the type 4-65A tubes in the Intermediate Power Amplifier

(*j*) T-1102, multiplier filament transformer

(*k*) T-901, filament and oven supply transformer in the Radio Frequency Oscillator 0-324/FRT-15B

(l) B-101, B-801 and B-1702, autotune system drive motors.

6. AUTOTUNE CONTROL SYSTEM.

a. GENERAL.—The circuits and equipment *(figure 2-18.)* that provide automatic channel selection, mode selection, tuning, switching, and type of excitation are controlled by the components comprising the Autotune Control and the Excitation Control chassis. The desired channel is selected by dialing the corresponding number on the dial. Dialing the desired channel on the telephone dial sets up a sequence of relay and mechanical tuning-mechanism operations that results in the automatic switching and tuning of the transmitter on the preset channel frequency. The mode of operation is selected by dialing "A1" for cw, "A2" for mcw, or "A4" for fsk or facsimile. "A3" for phone, does not have to be dialed as the autotune system is arranged to automatically set up the transmitter for phone operation if a new, or same channel, is selected. Tuning is accomplished with repositioning components which are referred to as autotune heads. These heads are capable of accurately repositioning adjustable switches, capacitors, and inductor elements. A list of these heads along with their function and the component which they drive is given in Table 2-2.

The driving elements for switching are of two different types. First, there are five rotary solenoid operated switches referred to as steppers. These steppers are used for positioning small wafer switches. Second, there are four motor driven switches. Each of these motor driven switches has a relay and coincidence wafer switch for starting and stopping. The motor driven switches are located in the tank circuits of the Power Amplifier and the Antenna Matching Network. A list of the steppers and motor driven switches are given in Table 2-4.

TABLE 2-2. AUTOTUNE HEAD COMPLEMENT

SYMBOL DESIGN	TYPE	LOCATION (Chassis)	FUNCTION (Panel Engraving)	DRIVEN ELEMENT
O-109	96W-1	Radio Frequency Oscillator O-317/FRT-15B	OUTPUT TUNING	C-120A/D
O-110	96X-1	Radio Frequency Oscillator O-317/FRT-15B	INTERPOLATION OSCILLATOR TUNING	Grid Inductor-Z-102
O-110A	96X-1	Radio Frequency Oscillator O-317/FRT-15B	MASTER OSCILLATOR TUNING	Grid Inductor-in Z-101
O-808	96W-1	Radio Frequency Modulator MD-245/FRT-15B	RF TUNING	C-805A/E
O-1112	96L-5	Exciter IPA	EXCITER TUNING	C-1106, C-1140/41
O-1332	96L-6	Power Amplifier	IPA PLATE AND PA GRID TUNING	C-1301, S-1303
O-1333	96L-5	Power Amplifier	PA PLATE TUNING	C-1307
O-1426	96L-6	Antenna Matching Network	LOAD TUNING	C-1406A/B S-1403
O-1427A	96L-5	Antenna Matching Network	SERIES TUNING	C-1401
O-1427	96L-5	Antenna Matching Network	COUPLING	Coupling plate between Antenna Matching Network and Power Amplifier chassis *(see figure 7)*

From Table 2-2 it is evident that ten autotune heads are used. Those heads bearing symbol designations 0-1112, 0-1332, 0-1333, 0-1426, 0-1427 and 0-1427A are driven by a line shaft common only to each of the three chassis involved (figure 2-18). In turn, each of the three line shafts are driven by a single vertical drive shaft that has couplings between each chassis to facilitate their individual removal for maintenance purposes. The drive shaft is turned by the autotune motor B-1702, located at the base of the Radio Frequency Amplifier AM-1116/FRT-15B cabinet. The line shaft in the Exciter-IPA chassis also drives control unit 0-1114 and limit switch assembly 0-1109 *(refer to table 2-3)*

Autotune heads 0-109, 0-110, 0-110-A and control unit 0-111 are driven by a common line shaft that is turned by a sprocket and chain assembly powered from autotune drive motor B-101. This motor is located in the Radio Frequency Oscillator 0-317/FRT-15B chassis.

The remaining autotune head 0-803 and control unit 0-809 are also driven by a sprocket and chain assembly powered from autotune motor B-801 in the Radio Frequency Modulator MD-245/FRT-15B.

TABLE 2-3. AUTOTUNE CONTROL UNITS AND LIMIT SWITCH COMPLEMENT

SYMBOL	TYPE	LOCATION (Chassis)	FUNCTION
O-111	111C-4	Radio Frequency Oscillator O-324/FRT-15B	Circuit seeking switch establishes positive contact on channel dialed for autotune heads in Radio Frequency Oscillator O-324/FRT-15B
O-809	111C-4	Radio Frequency Modulator MD-245/FRT-15B	Circuit seeking switch establishes positive contact on channel dialed for autotune head in Radio Frequency Modulator MD-245/FRT-15B
O-1114	103C-11	Exciter-IPA	Circuit seeking switch establishes positive contact on channel dialed for autotune heads in: (1) Antenna Matching Network, (2) Power Amplifier, (3) Exciter-IPA
O-1109	Refer to Section 8	Exciter-IPA	Energizes homing relay circuit to complete autotune cycle

Each autotune head is provided with a tuning knob so that the driven electrical element may be manually positioned. A locking bar is associated with each knob, thus making it possible to lock the element to the head after the element is manually set to the desired position. In the locked condition, the position of the element is fixed with respect to the autotune head, the line shaft, the drive shaft, all of the other heads, and the control units. Synchronization of these heads is explained in Section 7.

The control units O-1114, and O-1109 provide a control index for stopping the autotune drive at the proper channel position and close the circuit necessary for the operation of the homing relay in the autotune control system.

The control units O-111 and O-809 provide a control index, reversing relay, and limit switch for the autotune systems of the Radio Frequency Oscillator O-317/FRT-15B and Radio Frequency Modulator MD-245/FRT-15B.

As shown in Table 2-4 there are five rotary solenoid operated switches and four motor driven switches. All of these are electrically controlled by the autotune system, driven by B-1702. The desired position of each of these rotary solenoids and motors with the exception of S-712 and crystal selector S-902 must be preset for each channel by the operator.

To tune a channel to a particular frequency, certain information must be preset on the panel controls. If, for example, the transmitter is to be tuned to 16 megacycles for cw operation using the master oscillator for excitation on channel No. 5 - there are five things to preset.

(1) On the Excitation Control unit, channel switch No. 5 must be set for the desired type of excitation. In this case it should be set to position "A" corresponding to "master oscillator".

TABLE 2-4. STEPPER MOTORS AND STEPPER SOLENOIDS — COMPLEMENT

SYMBOL	FIGURE REF.	LOCATION (Chassis)	FUNCTION
S-711	7-37	Excitation Control	Drive for RF selector switch S-711B/C, and follower S-711A
S-712	7-37	Excitation Control	Drive for ground seeking circuit switch S-712B/D, and follower S-712A
S-808	7-27	Radio Frequency Modulator MD-245/FRT-15B	Drive for multiplication and fine tuning selector switch S-804
S-902	7-36	Radio Frequency Oscillator O-324/FRT-15B	Drive for crystal and capacitor tuning selector switch S-902B/C, and follower S-902A
S-1101	7-48	Exciter-IPA	Drive for frequency multiplier selector switch S-1101A/D
B-1301	7-44	Power Amplifier	Drive for plate inductance L-1311, L-1313, L-1314 band switch S-1325, and ground circuit seeking switch S-1302
B-1302	7-44	Power Amplifier	Drive for input grid inductance band switch S-1324A/B, follower S-1301A, and ground circuit seeking switch S-1301B
B-1401	7-40	Antenna Matching Network	Drive for inductor band switch S-1414A/C, and follower S-1401
B-1402	7-39	Antenna Matching Network	Drive for fixed load capacitors' switch S-1415A/D, and follower S-1402

(2) The tank coils of the Exciter-IPA and Power Amplifier grid circuits must be predetermined and preset. These coils are selected and set with the same channel switch. Using channel switch No. 5, of the EXCITER-IPA AND PA GRID RANGES group on the Power Amplifier chassis, set this according to Table 4-3. In this case for 16 megacycles, it should be in position No. 6.

(3) Next, the tank circuit coils for the Power Amplifier and the Antenna Matching Network must be selected and preset. These coils are controlled or set with the same channel switch. Using channel switch No. 5, of the PA PLATE AND OUTPUT TANK COILS group on the Power Amplifier chassis, set it according to Table 4-3. In this case for 16 megacycles, it should be set to position No. 8.

(4) Taking into consideration the carrier frequency and the antenna impedance, the fixed loading capacitor(s) must be selected and preset. Using channel switch No. 5, of the FIXED LOAD CAPACITOR SELECTOR group on the Antenna Matching Network chassis, set it according to Table 4-11. In this case for 16 megacycles and an antenna impedance of 100 ohms, it should be set to position No. 9.

(5) When the Crystal Oscillator is to be used, a crystal of correct frequency must be installed in the socket corresponding to the channel to be selected. In this example, if the Crystal Oscillator had been used it would have been necessary to install a four megacycle crystal in the socket corresponding to channel number five - which is XY-905.

After all of these steps have been done, the channel may be selected by dialing 5 on S-302 (local) or S-404 (remote)
After the channel is dialed, the mode selection is dialed by first dialing "A" then the number corresponding to the mode desired. In the example it would be "A1". After the autotune cycles, the autotune heads may be unlocked and the transmitter tuned as described in Section 4.

b. SEQUENCE OF OPERATION.-- Automatic tuning of the desired channel frequency and type of emission is accomplished by dialing first the number of the channel and the two digit combination which corresponds to the desired emission.

After the MAIN CIRCUIT BREAKER and the FILAMENT switch have been placed in the ON position, the LOCAL-REMOTE switch is placed in the desired position, the type of excitation preset, bands for the Exciter-IPA and PA grid are preset, the PA plate and output tank coils preset, fixed loading capacitors preset, and the proper crystal installed in the correct position, the sequence of operation is as follows *(figure 2-19.)*:

(1) Dial the desired channel on the appropriate telephone dial, depending on the position of control as set up by LOCAL-REMOTE switch S-303. As an example, assume that S-303 is in the LOCAL position and channel five has been dialed on S-302.

(2) As dial S-302 returns towards its rest position, pulsing relay K-604 will be operated a number of times corresponding to the number of pulses, five for channel five. The pulsing relay is energized through the normally closed contacts of homing relay K-605 - the closed contacts to ground on the telephone dial.

(3) Operation of the pulsing relay releases the "off" relay K-608, FSK relay K-301 - if either had been previously operated. Also, the pulsing relay energizes slow release relay K-607 (number one) and steps the stepping relay K-612 one position for each pulse.

(4) Slow release relay number one and the stepping relay are energized by the circuit through the normally open contacts of the pulsing relay and the normally-closed contacts of the motor start relay K-601.

(5) Operation of slow release relay K-607 energizes slow release relay K-606 (number two) and resets the PA plate overload relay K-510.

(6) Because of the slow-release characteristics of K-607, slow release relays number one and number two are held closed until after the last pulse from telephone dial S-302.

(7) When telephone dial S-302 comes to rest, slow release relay number one will release and break the energizing circuit to slow release relay number two. When slow release relay number one releases, a ground is applied to the "channel repeater" through the normally closed contacts of K-607 and the corresponding channel lead on K-612D. S-712 will not operate (at this time) from this ground as power (-48 V DC) is held off through the normally open contacts of the reverse interlock relay K-602.

(8) The release of slow release relay number two energizes motor start relay K-601, and reverse interlock relay K-602 through the circuit formed by contacts of stepping relay K-612B, the normally closed contacts of slow release relay number one and the normally closed contacts of slow release relay number two.

(*a*) Operation of motor-start relay K-601 energizes autotune drive motor B-1702 through the contacts of the motor-start and motor reverse relays.

(*b*) Operation of motor-start relay K-601 opens the plate control interlock circuit, de-energizing plate control relay K-508 and screen control relay K-509 - removing plate and screen power from the large tubes.

(*c*) Operation of motor-start relay K-601 removes power (220V AC) from the motor driven switches in the tank circuits of the Power Amplifier and Antenna Matching Network. Also, operation of motor start relay K-601 removes power (-48V DC) from the band stepping switch S-1101 in the Exciter-IPA and the control relays of the

motor driven switches of the Power Amplifier and Antenna Matching Network. Power is removed from the four motor driven switches and the Exciter-IPA band switch and control relays to prevent them from operating until channel information has been established. To clarify this: during the time the channel drum switches are rotating (operation of B-1702) there is no specific channel information available, so power is removed from the switch driven control relays and band switch by motor start relay K-601 to prevent erroneous operation.

(*d*) With power removed from the control relays of the switch drives, the operating ground for the multiply-by switch S-808 in the Radio Frequency Modulator MD-245/FRT-15B is removed by the normally open contacts of the control relay (K-1301) for B-1302 - the power amplifier grid switch drive. This is done for the same purpose that power is removed from the motor driven switches, to prevent erroneous operation since information has not been established for S-808 at this time.

(*e*) With power removed from the control relays of the motor driven switches, any one or all of them will energize K-611 the high-voltage hold-off relay, through their normally closed contacts to ground. With K-611 energized, the HV interlock circuit is open to prevent plate voltage from being applied until after all of the motor driven switches have been set up to their new position. K-611, being a slow release type relay, allows a small time lapse for the switches to come to a complete stop before plate voltage is applied.

(9) Operation of reverse interlock relay K-602 allows S-712, the channel repeater, to operate by applying power (-48V DC) through its normally open contacts. As S-712 operates, crystal selector stepper S-902 follows since power (-48V DC) has also been applied by the reverse interlock relay K-602. Operation of S-712 also establishes a new channel ground for 0-809 and 0-111, the autotune control units of the Radio Frequency Modulator MD-245/FRT-15B and the Radio Frequency Oscillator O-317/FRT-15B. The autotune components of these two units are independent in operation except for channel information. Assume they have operated to the desired channel.

(10) After the channel repeater S-712 has positioned, the excitation selector S-711 will operate to the new position as set up on the preset panel controls S-701 through S-710. The excitation selector does not operate until after the channel repeater has positioned because its operating ground is opened through the normally closed contacts of K-703 (control relay for S-712) while the channel repeater is rotating.

(11) As the autotune drive motor rotates, it drives autotune heads O-1426, O-1427, O-1427A, O-1332, O-1333, O-1112, control unit O-1114 and limit switch cam O-1109 - all counterclockwise. The cam drum switches, which control the motor driven switches, being coupled to O-1332 and O-1427 are also rotated.

(12) When the autotune drive motor B-1702 begins to operate, the limit switch S-1105 immediately opens and the motor continues to rotate until the rotor arm of the circuit seeking switch S-1104 reaches the position corresponding to the channel which has been dialed (position five for the example). Since the cam drums on the autotune heads are synchronized with S-1104, they are driven to the same point. The cam drum switches driven by O-1332 and O-1427 are also driven to the same point. This establishes channel information for the motor driven switches.

(13) When the circuit seeking switch reaches the position corresponding to the channel dialed, motor reverse relay K-603 is operated through the closed contacts of reverse interlock relay K-602. At the same time, the stop ring pawls of the autotune heads are seated in the proper cam slots for the desired channel.

(14) Operation of the motor reverse relay changes the power input connection to the autotune motor, reversing the direction of motor shaft rotation, driving the autotune heads clockwise until each one reaches its preset position - when each autotune head mechanism stops.

(*a*) Operation of the motor reverse relay K-603 returns power (-48V DC) to the Exciter-IPA band selector which operates to the position desired, as set up on the preset control S-1304 through S-1313.

(b) Operation of the motor reverse relay K-603 also returns power (-48V DC) to the control relays of the motor driven switches. The motor driven switches do not operate at this time because power (220V AC) is still held open by motor start relay K-601.

(15) The motor continues in reverse, the clutches of the autotune heads slipping until the limit switch S-1105 closes.

(16) Closing the limit switch energizes homing relay K-605 through: contacts of stepping switch S-612C, contacts of the limit switch, contacts of circuit seeking switch S-1104, contacts of the stepping relay K-612D, and the normally closed contacts of slow release relay K-607 (number one).

(17) Operation of the homing relay energizes slow release relay number one through the auxiliary contacts of the stepping relay K-612, the normally open contacts of the homing relay and the contact of stepping relay K-612A.

(18) Operation of slow release relay number one energizes slow release relay number two (K-606).

(19) Operation of slow release relay number two releases the motor start relay and the reverse interlock relay to stop the autotune drive motor and release the motor reverse relay.

(*a*) Stepping relay K-612 is also energized by the operation of the homing relay and it operates and releases, stepping to position No. 27.

(*b*) Operation of the stepping relay to position No. 27 releases the homing relay and slow release relay number one.

(20) When motor start relay K-601 releases (channel information having been established), power is applied to the motor driven switches through the normally closed contacts of the motor control relay. The motor begins to rotate driving the associated seeking wafer until the wiper arm reaches the contact corresponding to the desired position - as set up on the preset panel controls.

(21) As each switch reaches this point its associated control relay is energized to open the power circuit (220V AC) to the drive motor, thus stopping it.

(22) When the control relay K-1301 for the motor driven Power Amplifier grid circuit switch is energized, the operating ground for S-808 multiply-by switch in the Radio Frequency Modulator MD-245/FRT-15B is closed - allowing it to operate to the position set up by S-1301B (its control wafer on the Power Amplifier grid switch).

(23) As each of the control relays for the motors is energized, the holding grounds for K-611 (the HV hold-off relay) are opened. After the last ground is opened, K-611 is released.

(24) When the high-voltage hold-off relay K-611 releases, the plate and screen control relay operate from the ground through the normally closed contacts of K-611 and the motor start relay K-601. With the operation of K-508 plate and K-509 screen control relays, plate and screen power is restored.

(25) Thus, when slow release relay number two has released, S-808 positioned, and plate voltage restored, the channel selection and tuning cycle is complete.

(26) When the channel selection and tuning sequence is completed, the channel will be set up for phone emission (A3). When emission other than phone (which is automatic) is desired, it may be obtained by manual operation of dial S-302 or S-404.

(*a*) Dial first "A" then "1", or "2", or "4" corresponding to CW, MCW or FSK. For example, dial "A1" for CW.

(*b*) As dial S-302 or S-404 returns to its rest position, pulsing relay K-604 will operate, first 11 times for "A" and then once more for "1". The sequence of operation involving slow release relays number one and number two, and power amplifier plate over-load relay, is exactly the same as described in the foregoing.

(*c*) The 11 pulse operation of pulsing relay K-604 operates stepping relay K-612 to the No. 11 position. This being an open ("A") position, K-612 is held until the "1" pulse of K-604 steps it to position No. 12 corresponding to CW.

(*d*) When the dial comes to rest, slow release relay, number one will release and break the energizing circuit. Slow release relay number one energizes CW control relay K-610. Homing relay K-605 is energized through its own contacts, K-612C and K-612B and the contacts of slow release relays numbers one and two.

(*e*) The operation of the CW relay energizes phone-cw relay K-1501 through the contacts of CW relay K-610 and pulsing relay K-604.

(*f*) Operation of the homing relay steps the stepping relay to position No. 27, while the operation of the phone-cw relay K-1501 connects +4200 volts to the Power Amplifier plates, and shorts out the secondary of the modulation transformer T-1501, as well as removing screen voltage from the modulator.

This completes the set up of the transmitter for CW emission. The sequence for setting-up on FSK, MCW or dialing the transmitter OFF remotely, is similar. FSK relay K-609 removes the ground from the cathode of V-1201 (first

keyer tube), which turns the carrier on, and energizes CW relay K-610, and also transfers the key line from the Exciter-IPA to the Radio Frequency Modulator MD-245/FRT-15B. MCW relay K-301, in the energized position, connects the 1000 cycle output of audio oscillator V-306 to input transformer T-301 of the Audio Frequency Amplifier AM-1150/FRT-15B providing the tone for MCW modulation. OFF relay K-608, in the energized position, breaks the control line to filament contactor K-505, turning the transmitter OFF. Any operation of the dial in the remote position will cause pulsing relay K-604 to operate, removing the holding ground of the OFF relay K-608, allowing the transmitter to come on.

c. THE AUTOTUNE HEAD AS A UNIT *(see figure 2-17)*.—To develop an understanding of the system, the mechanical operation of the autotune head is described. Autotune heads are of two general types; those which can select positions within one rotation of the control shaft, and those which can select positions within more than one turn. The former are called "singleturn", and the latter "multiturn". All autotune heads are fundamentally similar in construction and operation.

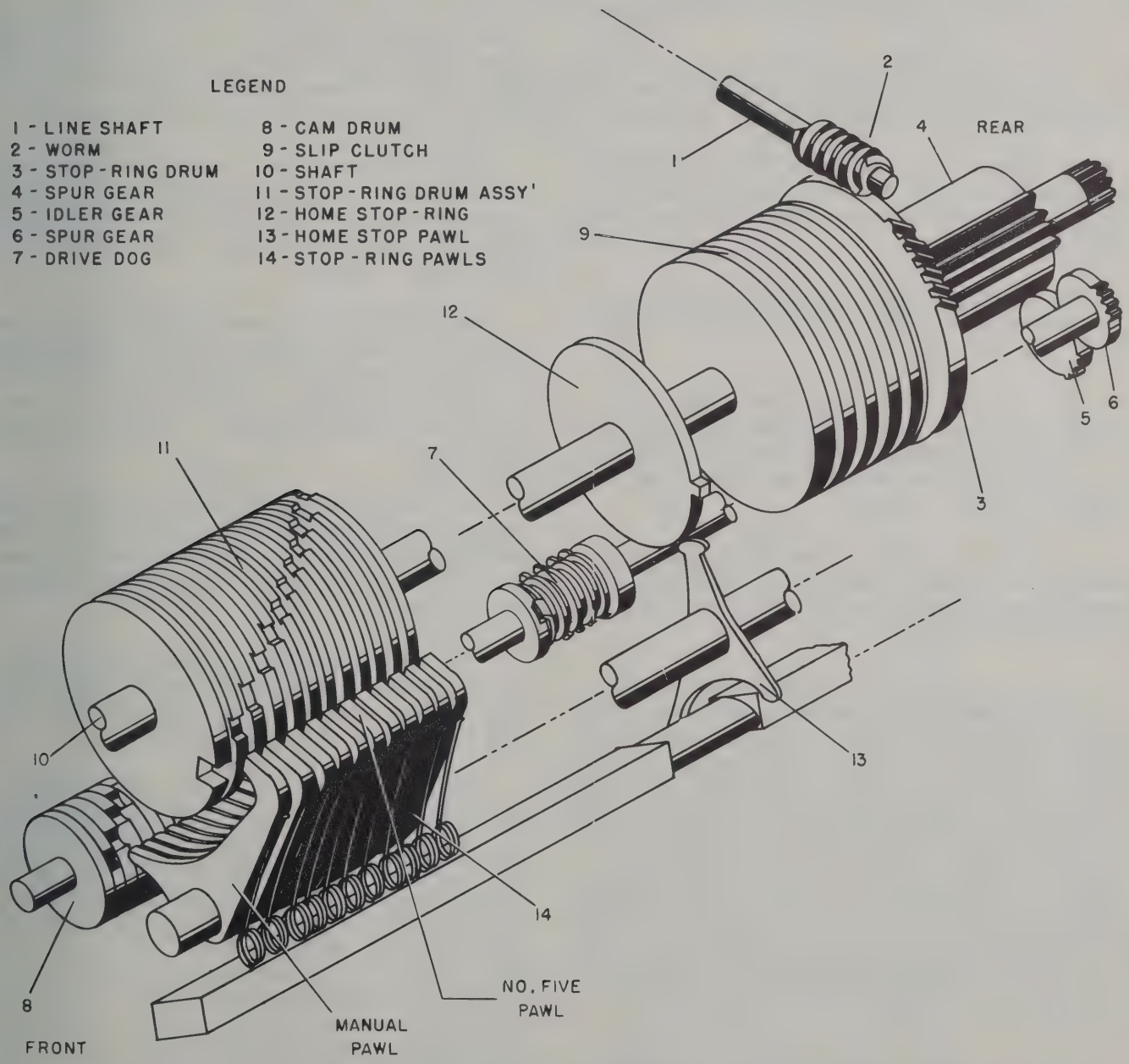


Figure 2-17. Autotune Head, Functional Diagram

(1) The shaft (10) extends from the back of the autotune head and is coupled to the element to be driven. The shaft also extends from the front of the head, and a knob is attached to it for manual tuning and channel setting.

(2) An electric motor turns the drive shaft, or the chain and sprocket assembly, which in turn, drives the line shaft (1). A control unit O-111, O-809, and O-1114 *(see figure 2-18)* is also driven by the line shaft through a separate worm (2) *(figure 2-17)*. The control unit contains switches that control the autotune drive motor.

(3) The worm (2) drives the head and is fastened to the line shaft (1) with a groove-pin.

(4) The slip-clutch worm gear is fastened to the cam-drum-drive spur gear and drives the stop-ring drum (3) through the slip clutch (9).

(5) The cam-drum-drive spur gear (4) is fastened directly to the slip clutch worm gear (3) and drives the cam spur gear (6) through the idler gear (5).

(6) The idler gear (5) transmits power from the cam-drum-drive spur gear (4) to the cam drum spur gear (6).

(7) The cam drum spur gear (6) is driven by the line shaft (1) through the worm (2), the cam-drum-drive spur gear (4) and the idler gear (5). The spur gear drives the cam drum (8) through the drive dog (7).

(8) The slip clutch drum (9) is driven directly from the slip clutch worm gear (3). The drum (not the clutch band) is fastened to the stop ring drum shaft (10).

(9) The stop-ring drum assembly (11) consists of 12 stop rings mounted on a shaft with spacers between the rings. The stop rings are free to rotate but the spacers are keyed to the shaft in a manner such that the rotation of a stop ring will not change the position of adjacent rings. The stop rings may be locked in position by rotating the locking bar on the front of the dial (not shown) in a clockwise direction. The locking mechanism consists of a bar mounted on a screw that applies pressure to the stack of stop rings and spacers as the screw is rotated clockwise and thereby, in effect, locks the stop rings in position.

(10) The tuned element is fastened rigidly to the rear of the stop-ring shaft (10).

(11) The cam drum (8) consists of 12 cams mounted on a shaft with adjacent cam slots staggered 30 degrees apart. These cams are rigidly fastened to the cam drum. The drive dog (7), mounted on the shaft behind the cam drum, drives the cam drum.

(12) The drive dog is fastened to the cam drum shaft and when engaged drives the cam drum (8). The drive dog is used to keep the cam drum of the heads synchronized.

(13) The idler gear shaft is fastened rigidly to the back plate of the head.

(14) The home stop pawl (13), limits the rotation of the head. The pawl is located on the same shaft as the stop-ring pawls (14) and is engaged by the home stop-ring (12). The pawl limits the rotation of the stop-ring drum (11).

(15) The home stop ring (12), mounted with the other stop rings (11) on the stop-ring drum, is rigidly fastened to the drum. The home stop pawl (13) engages the ring to limit the rotation of the stop-ring drum.

(16) The dial (not shown) is fastened to the stop-ring drum (11) and permits the calibration of the tuned element. The locking bar is located on the front of the dial and requires only a fraction of a revolution to lock or unlock the stop rings.

(17) The heel of each stop-ring pawl is held against the cam drum (8) by the pawl spring. The toe serves to position the tuned element by stopping the stop-ring drum (11) at the predetermined position.

(18) The pawl spring presses the pawl heel against the cam drum, and when the pawl drops into the cam slot, the pawl spring presses the pawl toe against the stop-ring drum.

(19) In operation, the worm (2) drives the shaft (10) through worm gear (3) and slip clutch (9). The cam drum (8) is driven through gears (4), (6), and (5). To establish a dial setting, the channel selector is first operated to choose the channel number for which the setting is desired. This starts the autotune drive motor, and the cam drum (8) is turned counterclockwise so that each slot in the drum passes beneath its respective pawl (14) heel. When the heel of the pawl, corresponding to the desired channel falls into its slot in the cam drum, switches on the control unit reverse the autotune driving motor. The

IFIER AM-1116/FRT-15B

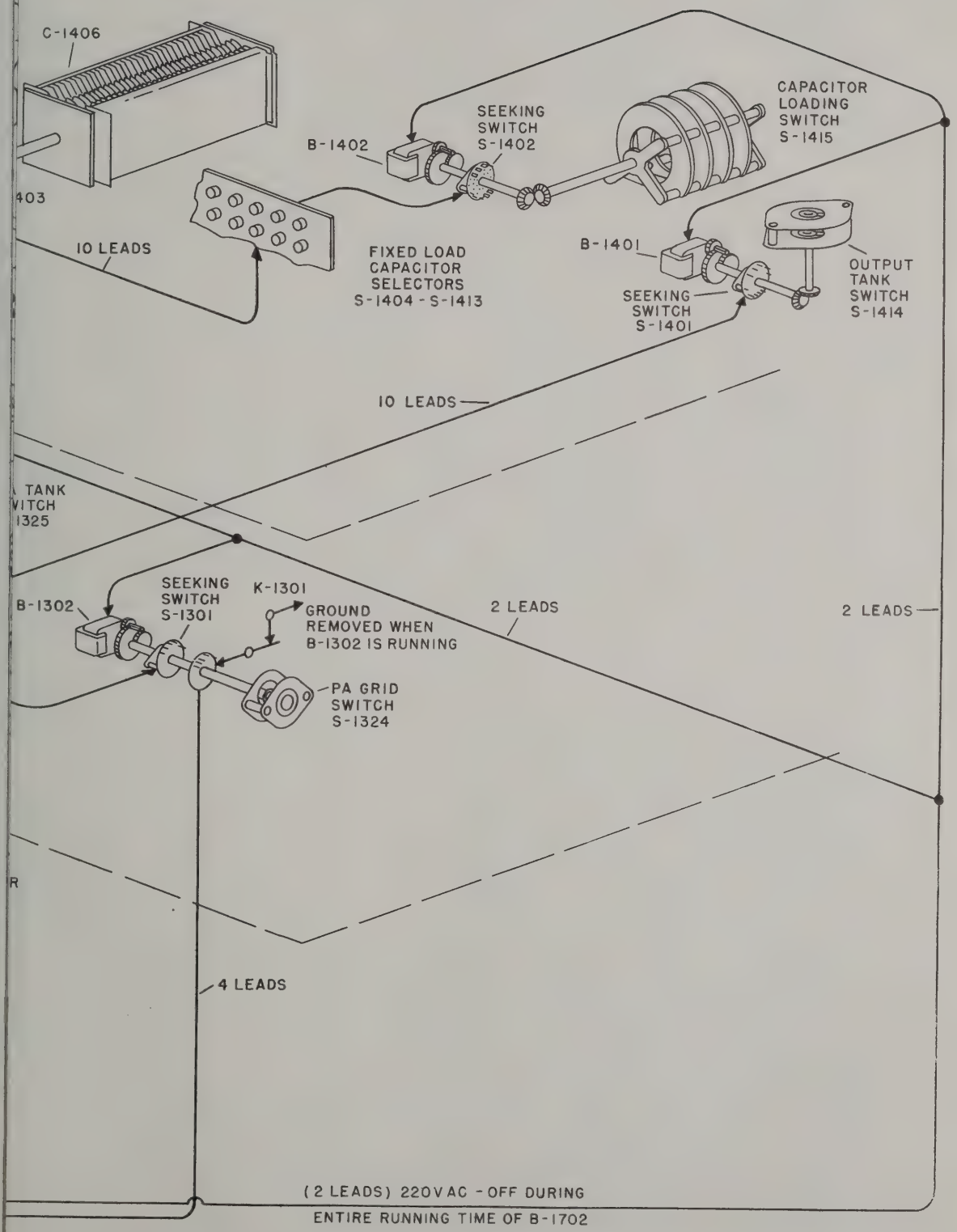


Figure 2-18. Autotune System, Functional Block Diagram

(1) The shaft (10) extends from the back of the autotune head and is coupled to the element to be driven. The shaft also extends from the front of the head, and a knob is attached to it for manual tuning and channel setting.

(2) An electric motor turns the drive shaft, or the chain and sprocket assembly, which in turn, drives the line shaft (1). A control unit O-111, O-809, and O-1114 *(see figure 2-18)* is also driven by the line shaft through a separate worm (2) *(figure 2-17)*. The control unit contains switches that control the autotune drive motor.

(3) The worm (2) drives the head and is fastened to the line shaft (1) with a groove-pin.

(4) The slip-clutch worm gear is fastened to the cam-drum-drive spur gear and drives the stop-ring drum (3) through the slip clutch (9).

(5) The cam-drum-drive spur gear (4) is fastened directly to the slip clutch worm gear (3) and drives the cam spur gear (6) through the idler gear (5).

(6) The idler gear (5) transmits power from the cam-drum-drive spur gear (4) to the cam drum spur gear (6).

(7) The cam drum spur gear (6) is driven by the line shaft (1) through the worm (2), the cam-drum-drive spur gear (4) and the idler gear (5). The spur gear drives the cam drum (8) through the drive dog (7).

(8) The slip clutch drum (9) is driven directly from the slip clutch worm gear (3). The drum (not the clutch band) is fastened to the stop ring drum shaft (10).

(9) The stop-ring drum assembly (11) consists of 12 stop rings mounted on a shaft with spacers between the rings. The stop rings are free to rotate but the spacers are keyed to the shaft in a manner such that the rotation of a stop ring will not change the position of adjacent rings. The stop rings may be locked in position by rotating the locking bar on the front of the dial (not shown) in a clockwise direction. The locking mechanism consists of a bar mounted on a screw that applies pressure to the stack of stop rings and spacers as the screw is rotated clockwise and thereby, in effect, locks the stop rings in position.

(10) The tuned element is fastened rigidly to the rear of the stop-ring shaft (10).

(11) The cam drum (8) consists of 12 cams mounted on a shaft with adjacent cam slots staggered 30 degrees apart. These cams are rigidly fastened to the cam drum. The drive dog (7), mounted on the shaft behind the cam drum, drives the cam drum.

(12) The drive dog is fastened to the cam drum shaft and when engaged drives the cam drum (8). The drive dog is used to keep the cam drum of the heads synchronized.

(13) The idler gear shaft is fastened rigidly to the back plate of the head.

(14) The home stop pawl (13), limits the rotation of the head. The pawl is located on the same shaft as the stop-ring pawls (14) and is engaged by the home stop-ring (12). The pawl limits the rotation of the stop-ring drum (11).

(15) The home stop ring (12), mounted with the other stop rings (11) on the stop-ring drum, is rigidly fastened to the drum. The home stop pawl (13) engages the ring to limit the rotation of the stop-ring drum.

(16) The dial (not shown) is fastened to the stop-ring drum (11) and permits the calibration of the tuned element. The locking bar is located on the front of the dial and requires only a fraction of a revolution to lock or unlock the stop rings.

(17) The heel of each stop-ring pawl is held against the cam drum (8) by the pawl spring. The toe serves to position the tuned element by stopping the stop-ring drum (11) at the predetermined position.

(18) The pawl spring presses the pawl heel against the cam drum, and when the pawl drops into the cam slot, the pawl spring presses the pawl toe against the stop-ring drum.

(19) In operation, the worm (2) drives the shaft (10) through worm gear (3) and slip clutch (9). The cam drum (8) is driven through gears (4), (6), and (5). To establish a dial setting, the channel selector is first operated to choose the channel number for which the setting is desired. This starts the autotune drive motor, and the cam drum (8) is turned counterclockwise so that each slot in the drum passes beneath its respective pawl (14) heel. When the heel of the pawl, corresponding to the desired channel falls into its slot in the cam drum, switches on the control unit reverse the autotune driving motor. The

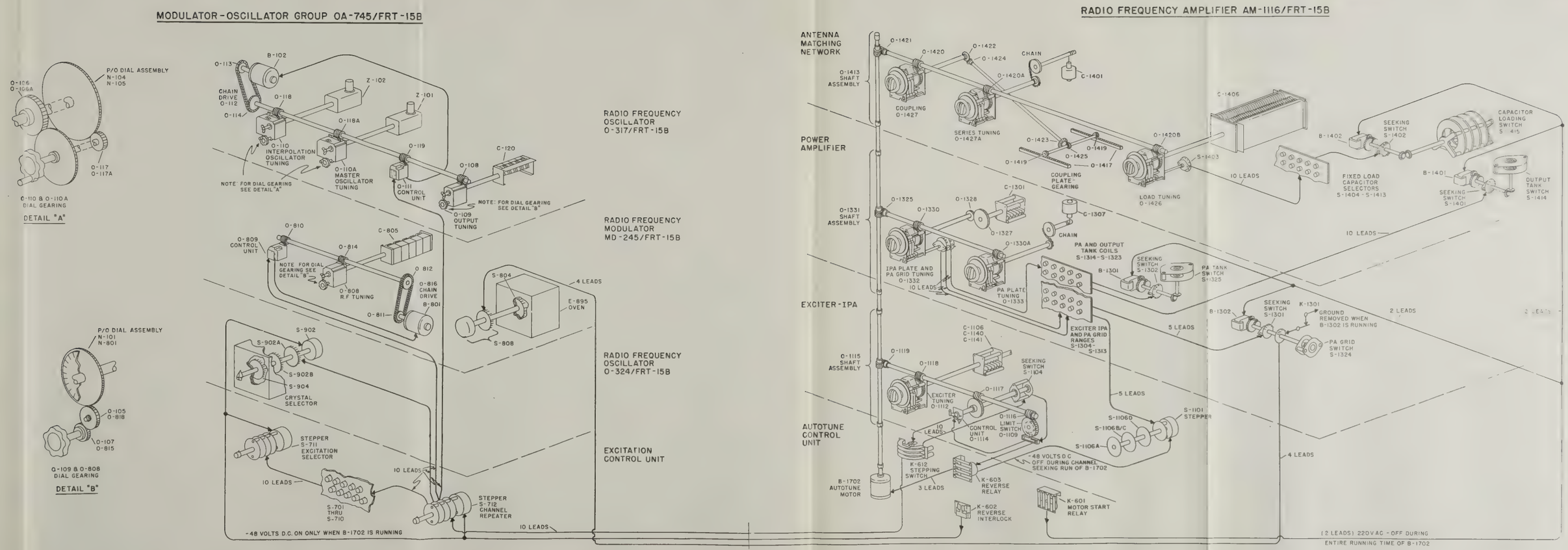
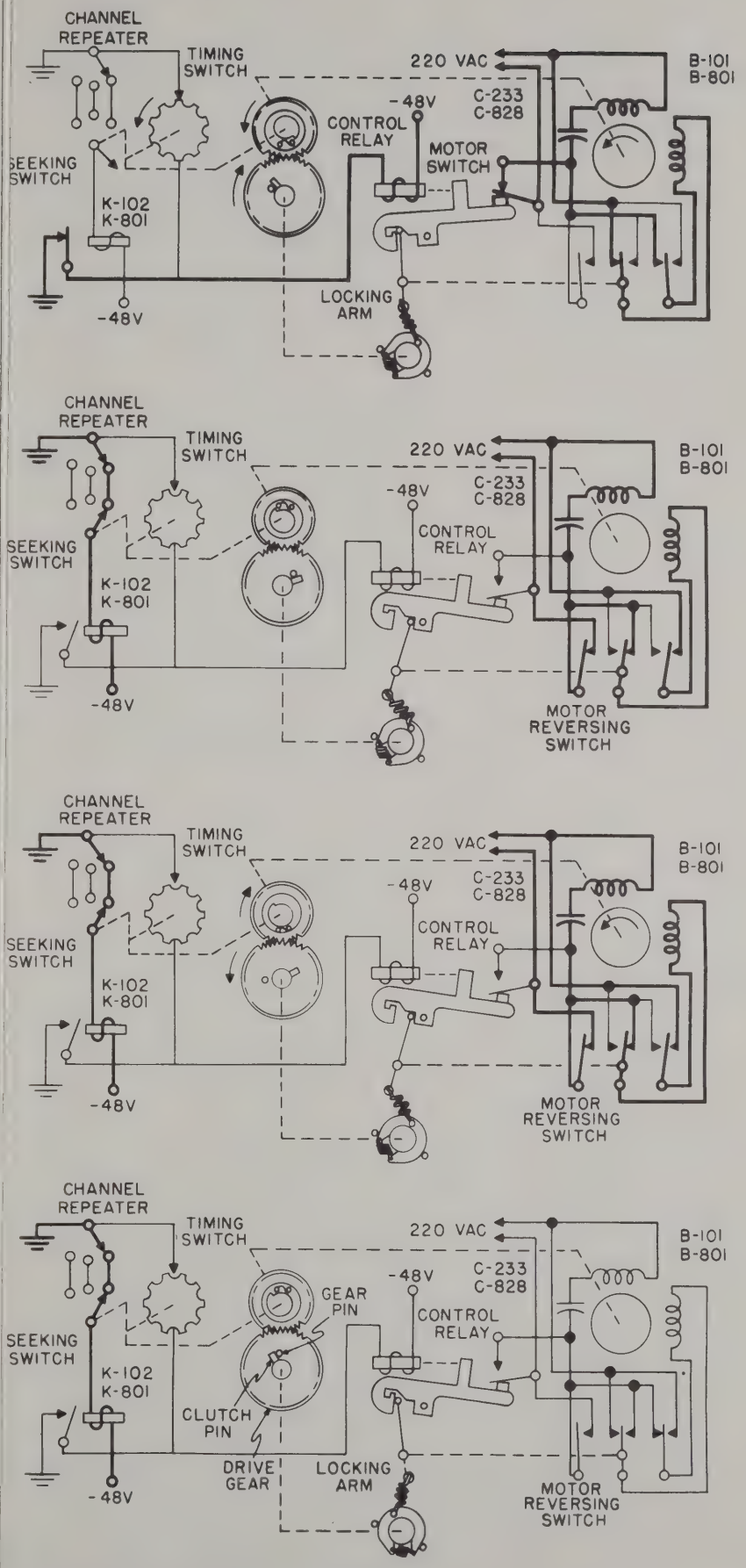
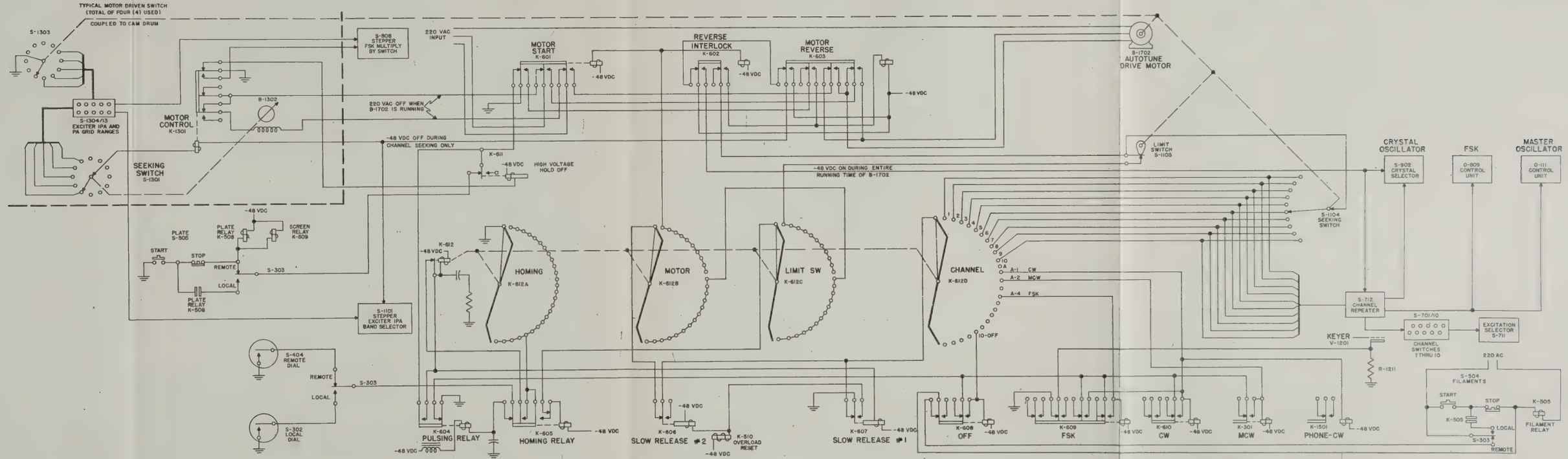


Figure 2-18. Autotune System, Functional Block Diagram



Autotune System, Sequence of Operation



OPERATOR DIALS FREQUENCY CHANNEL ON S-302 OR S-404

PULSING RELAY K-604 OPERATES IMMEDIATELY ONCE FOR EACH DIAL PULSE

OPERATION OF PULSING RELAY RELEASES TRANSMITTER OFF RELAY K-606, FSK RELAY K-609, MCW RELAY K-301, AND CW RELAY K-610 IF EITHER HAS BEEN OPERATED

CW RELAY HAVING BEEN RELEASED, RELEASES K-1501 PHONE-CW RELAY IF IT HAS BEEN OPERATED

DIAL S-302 OR S-404 RETURNS TO REST

OPERATION OF PULSING RELAY ENERGIZES SLOW RELEASE RELAY NO. 1 AND STEPS ROTARY SWITCH K-612 ONCE FOR EACH PULSE

FSK RELAY HAVING BEEN RELEASED GROUNDS CATHODE V-1301 (FIRST KEYER TUBE) THERE BY TURNING THE CARRIER OFF, IF FSK HAD BEEN USED

RELEASING OF K-608 OFF RELAY TURNS THE TRANSMITTER ON BY ENERGIZING FILAMENT RELAY K-505, IF LOCAL-REMOTE SWITCH IS IN REMOTE POSITION AND K-608 HAS BEEN OPERATED

ROTARY STEPPING SWITCH K-612 OPERATES

OPERATION OF SLOW RELEASE RELAY No. 1 ENERGIZES SLOW RELEASE RELAY No. 2 AND GROUNDS RESET COIL OF K-510 OVERLOAD RELAY

SLOW RELEASE RELAY No. 2 OPERATES

A NEW CHANNEL HAVING BEEN ESTABLISHED IN O-809 AND O-111 THE AUTOTUNE SYSTEMS OF THE MASTER OSC AND FSK OPERATE

S-712 HAVING BEEN OPERATED ALLOWS S-711 TO OPERATE TO SELECT THE PRESET TYPE OF EXCITATION

SLOW RELEASE RELAY NO. 2 RELEASES

BECAUSE OF SLOW RELEASE CHARACTERISTICS K-607 RELEASES ONLY AFTER LAST DIAL IMPULSE

SLOW RELEASE RELAY NO. 1 HAVING BEEN RELEASED AND ROTARY STEPPING SWITCH OPERATED, GROUND IS APPLIED TO THE CORRESPONDING CHANNEL LEAD CONNECTED TO S-712 CHANNEL REPEATER

OPERATION OF S-712 REPEATS THE CHANNEL INFORMATION TO THE CRYSTAL SELECTOR S-902, CONTROL UNIT O-809, AND CONTROL UNIT O-111

SLOW RELEASE RELAY NO. 2 HAVING BEEN RELEASED ENERGIZES K-601 MOTOR START RELAY AND REVERSE INTERLOCK RELAY K-602

REVERSE INTERLOCK RELAY K-602 OPERATES

REVERSE INTERLOCK RELAY HAVING BEEN OPERATED, POWER (-48 VOLTS) IS APPLIED TO S-712 AND S-902

A NEW CHANNEL HAVING BEEN ESTABLISHED FOR S-902 CRYSTAL SELECTOR, AND POWER APPLIED FROM OPERATION OF K-602, S-902 OPERATES

MOTOR START RELAY K-601 OPERATES

OPERATION OF K-601 REMOVES GROUND TO K-508 AND K-509 TURNING OFF THE PLATE VOLTAGE ALSO REMOVES POWER (220 V AC) FROM B-1302, POWER (-48 VOLTS DC) FROM RELAY K-1301 AND STEPPING SWITCH S-1101

WHEN B-1702 ROTATES K-1301 RELEASES BECAUSE CHANNEL DRUM SWITCH S-1303 MOVES TO NEW CHANNEL DIALED

K-1301 RELEASES, ENERGIZING K-611 HIGH VOLTAGE HOLD OFF RELAY, AND OPENS OPERATING GROUND FOR S-808 FSK MULTIPLY BY SW

OPERATION OF K-601 ENERGIZES B-1705 AUTO TUNE MOTOR

B-1702 BEGINS TO ROTATE COUNTER CLOCKWISE AS VIEW FROM TOP OF BAY

LIMIT SWITCH S-1105 DRIVEN BY B-1702 OPENS

K-1301 HAVING BEEN ENERGIZED APPLIES A GROUND TO S-808 MULTIPLY BY SWITCH ALLOWING IT TO OPERATE

K-611 OPERATES OPENING CIRCUIT TO PLATE CONTROLS THEREBY PREVENTS THE PLATE VOLTAGE FROM COMING ON UNTIL MOTOR DRIVEN SWITCHES HAVE POSITIONED

OPERATION OF K-603 APPLIES POWER (-48 V DC)TO EXCITOR-IPA BAND SELECTOR S-1101 ALLOWING IT TO OPERATE TO PRESET POSITION

B-1702 CONTINUES TO ROTATE UNTIL CIRCUIT SEEKING SWITCH S-1104 REACHES CONTACT CORRESPONDING TO CHANNEL DIALED THIS ENERGIZES K-603 MOTOR REVERSE RELAY

WHEN POSITION HAS BEEN REACHED K-1301 IS ENERGIZED REMOVING POWER TO THE DRIVE MOTOR B-1302

K-1301 HAVING BEEN ENERGIZED OPENS GROUND CIRCUIT TO K-611 HIGH VOLTAGE HOLD OFF RELAY, ALLOWING THE PLATE VOLTAGE TO COME ON

B-1702 CONTINUES TO ROTATE IN THIS DIRECTION RECLOSING LIMIT SWITCH S-1105 ENERGIZING K-605 HOMING RELAY

OPERATION OF K-603 REVERSES DIRECTION OF ROTATION OF B-1702 AUTOTUNE MOTOR

POWER (270 V AC) IS APPLIED TO B-1302 WHEN K-601 MOTOR START RELAY RELEASES

B-1302 ROTATES UNTIL SEEKING S-1301 REACHES POSITION CORRESPONDING TO PRESET CHANNEL POSITION

OPERATION OF HOMING RELAY ENERGIZES SLOW RELEASE NO. 1

OPERATION OF SLOW RELEASE NO. 1 ENERGIZES SLOW RELEASE NO. 2

OPERATION OF SLOW RELEASE NO. 2 DE-ENERGIZES MOTOR START RELAY AND MOTOR INTERLOCK RELAY

DE-ENERGIZING OF MOTOR START RELAY RELEASE MOTOR REVERSE RELAY

ROTARY STEPPING SWITCH K-612 OPERATES UNTIL IT REACHES POSITION NO. 27

HOMING RELAY RELEASES AND OPENS CIRCUIT TO COIL OF SLOW RELEASE RELAY NO. 1

SLOW RELEASE RELAY NO. 1 RELEASES AND OPENS CIRCUIT TO COIL OF SLOW RELEASE RELAY NO. 2

SLOW RELEASE RELAY NO. 2 RELEASES, S-808 POSITIONS AND PLATE VOLTAGE COMES ON TO COMPLETE THE AUTOTUNE CYCLE

Figure 2-19. Autotune System, Sequence of Events

switches in the control unit are synchronized with the rotation of the cam drum during this half-cycle so that the motor stops and reverses just as the proper slot appears under its pawl heel. During at least part of this half-cycle, the stop-ring drum (11) also rotates counterclockwise, but a tab on home-stop ring (12) contacts home-stop pawl (13) and halts rotation of the drum. The clutch (9) slips during the remainder of the half-cycle.

(20) When the motor reverses, drive-dog assembly (7) disengages so that the cam drum remains in the position corresponding to the channel setting. The stop-ring drum (11) rotates clockwise until the pawl toe of the selected pawl falls into a slot. None of the other pawls can bear against their stop rings because the cam drum holds all other pawl heels up, and therefore holds the toes of these pawls away from the stop rings. When the toe falls into the slot in its stop-ring, shaft (10) is unable to rotate and the clutch slips until the control unit stops the autotune drive motor.

(21) The desired dial setting may now be made. A screw-and-locking-bar (not shown) extending from shaft (10) must be loosened one-half revolution; this disengages the stop-ring from the shaft. In this condition, the ring engaged by a pawl may slip while the shaft is turned; but the other stop rings, which are not retained by pawls, will turn with the shaft and remain in the previous positions with respect to the shaft. After the dial setting is made, the stop-ring lock is again tightened, and the setup is complete.

(22) At any time this particular dial setting is again required, the channel selector may be operated to choose the proper channel number and the process just described will be repeated. The motor will turn the cam drum to the proper position while at the same time shaft (10) and the stop-ring drum are halted in preparation for the remaining half-cycle. The motor reverses and turns shaft (10) clockwise until the pawl toe drops into the slot in its stop-ring. Shaft (10) is then in exactly the desired position and so is the shaft of the element being positioned.

(23) As before, the motor will continue to run slipping clutch (9) until the control unit stops it - but the shaft will remain in the desired position. Dial settings may be made at any time, but during automatic cycling the stop-ring lock must be tight. If it is not, during the first half-cycle one of the pawl toes may fall into a stop-ring as the pawl heel passes over its cam-drum slot. If that particular channel had previously been set, the setting will be changed as the ring is moved. If the lock is tight, the setting will not be disturbed. The stop ring drum will stop momentarily and the clutch will slip until the pawl heel is pushed from its slot in the cam drum.

d. CONTROL UNIT.—In operation, a channel is selected by dialing a desired number from one to ten. This operation causes K-612 *(figure 2-18.)* to set up the channel line to the seeking switch S-1104 and it in turn completes the circuit to the control unit. The control unit is the mechanism that sets the motor and the autotune elements in motion and permits the selection of the right combination of mechanical sequences that will end up with the heads positioned at the channel number dialed. The control unit complement is listed in Table 2-3.

e. LIMIT SWITCH *(refer to table 2-3.)* .— The limit switch 0-1109 is mounted on the Exciter-IPA autotune casting. The contacts are immediately opened when motor B-1702 begins to rotate. When the motor has reversed and returned to the original position, the switch contacts are closed and the circuit necessary for the operation of the homing relay (p/o K-612) is completed.

f. DRIVE MOTORS.—The drive motor (B-1702) at the base of Radio Frequency Amplifier AM-1116/FRT-15B *(see figure 7-11.)* is a three-phase 220 volt AC squirrel cage induction type motor. Output is a direct drive take-off through a rigid coupling to the vertically positioned autotune drive shaft *(figure 2-18.)* . Line shafts at the Exciter-IPA, Power Amplifier, and Antenna Matching Network chassis convey the shaft motion directly to the autotune heads control unit and limit switch in this bay. The autotune drive motors B-101, and B-801 in the Radio Frequency Oscillator 0-317/FRT-15B and in the Radio Frequency Modulator MD-245/FRT-15B chassis, are of the 220 volt AC single phase induction type. Power is taken from B-101 and B-801 by separate chain and sprocket drive assemblies. These assemblies convey the power directly to the line shaft associated with each of the two chassis.

g. STEPPER MOTORS AND STEPPER SOLENOIDS.—Channel information is also carried by stepper type motors and stepper type rotary solenoid switches. The full complement of these components is given in Table 2-4.

(A)

a. A frequency channel has been selected by operating the CHANNEL REPEATER switch. Relay K-102 has de-energized allowing THE CONTROL RELAY to energize. THE CONTROL RELAY is assumed to be energized but has not yet operated.

(B)

a. THE CONTROL RELAY has been operated as a result of completing the circuit to ground through normally closed relay, K-102.

b. The contacts of THE CONTROL RELAY have closed to complete the Autotune motor energizing circuit.

c. The armature of the motor has not begun to rotate.

d. The relay locking arm has dropped into position.

(C)

a. The armature of the motor has' rotated counterclockwise (viewed from motor shaft end).

b. The seeking switch and the timing switch cam have rotated one-half of a revolution in a counterclockwise direction.

c. THE CONTROL RELAY is still operated.

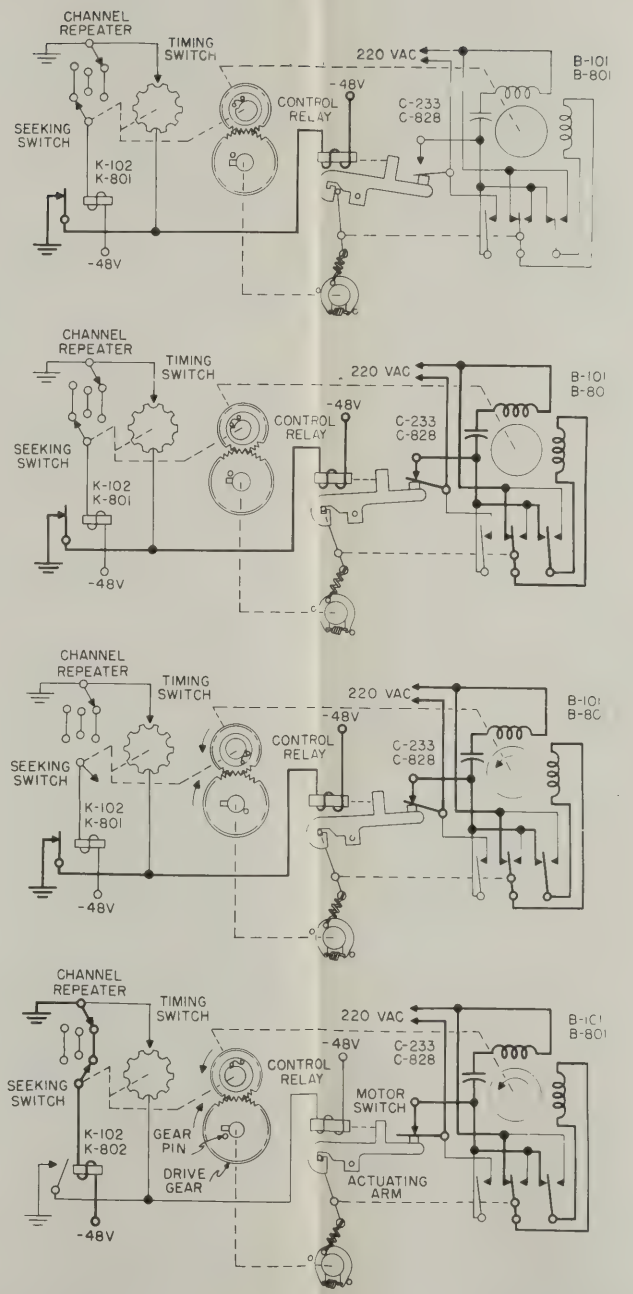
(D)

a. The motor armature is still rotating in a counterclockwise direction.

b. The seeking switch and the timing switch cam have continued to rotate counterclockwise and have reached the position that completes the circuit of relay K-102. Relay K-102 has operated thereby de-energizing THE CONTROL RELAY.

c. THE CONTROL RELAY is held closed, however, by the relay locking arm.

d. The pin on the drive gear approaches the pin on the clutch which drives the actuating arms of both the motor switch and THE CONTROL RELAY.



(E)

a. The motor armature is still rotating in a counterclockwise direction.

b. The seeking switch and the timing switch cam have continued to rotate' counterclockwise breaking the ground to K-102 and thus energizing THE CONTROL RELAY.

c. The clutch has continued to operate and has compressed the spring which drives the actuating arm of the motor switch and THE CONTROL RELAY locking arm. The locking arm has unlocked THE CONTROL RELAY.

(F)

a. The seeking switch and the timing switch have reached the position which energizes relay K-102 and de-energizes THE CONTROL RELAY.

b. THE CONTROL RELAY opens and causes the motor armature to cease counterclockwise rotation.

c. The compressed spring on the locking arm operating clutch operates the motor reversing switch to the reverse position.

d. The motor armature begins to rotate in a clockwise direction.

(G)

a. The motor armature is still operating in a clockwise direction.

b. The motor reversing switch is still held in place by the locking arm operating clutch spring.

(H)

a. The pin on the drive gear engages the pin on the clutch which drives the actuating arms of both the motor reversing switch and the locking arm, and restores the switch to the original position.

b. The motor is de-energized and completes the clockwise rotation.

c. The AUTOTUNE cycle is completed and THE CONTROL RELAY is held energized keeping the system ready for the selection of a new frequency.

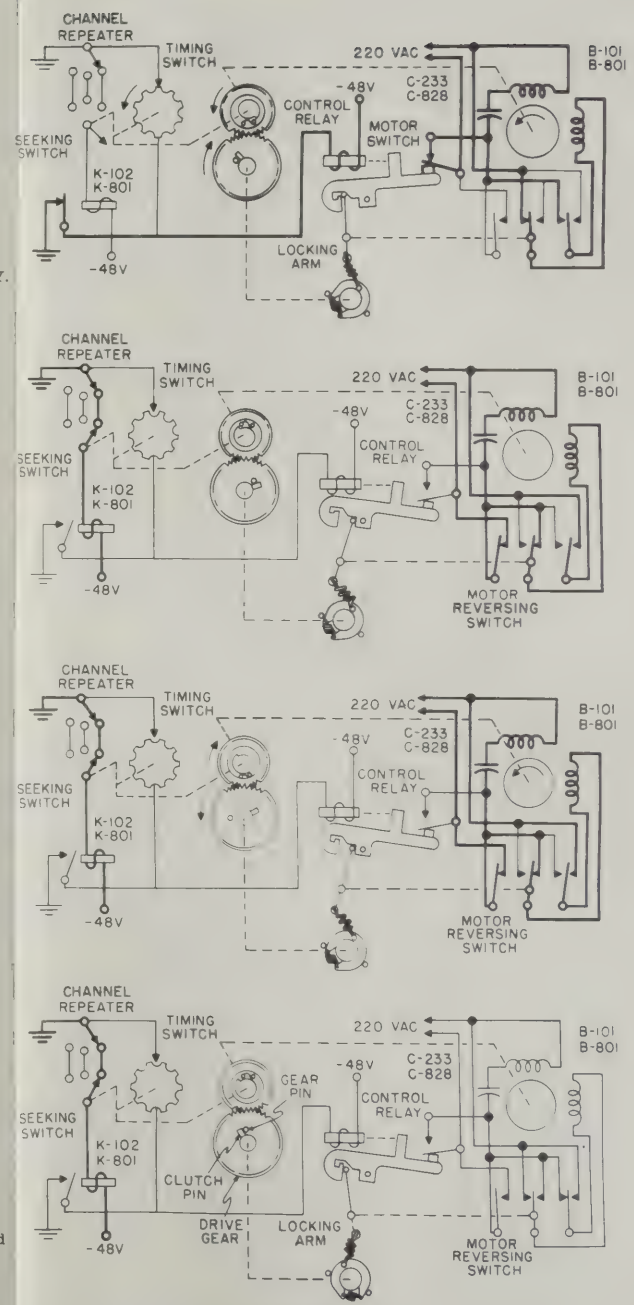


Figure 2-20. Autotune System, Sequence of Operation

switches in the control unit are synchronized with the rotation of the cam drum during this half-cycle so that the motor stops and reverses just as the proper slot appears under its pawl heel. During at least part of this half-cycle, the stop-ring drum (11) also rotates counterclockwise, but a tab on home-stop ring (12) contacts home-stop pawl (13) and halts rotation of the drum. The clutch (9) slips during the remainder of the half-cycle.

(20) When the motor reverses, drive-dog assembly (7) disengages so that the cam drum remains in the position corresponding to the channel setting. The stop-ring drum (11) rotates clockwise until the pawl toe of the selected pawl falls into a slot. None of the other pawls can bear against their stop rings because the cam drum holds all other pawl heels up, and therefore holds the toes of these pawls away from the stop rings. When the toe falls into the slot in its stop-ring, shaft (10) is unable to rotate and the clutch slips until the control unit stops the autotune drive motor.

(21) The desired dial setting may now be made. A screw-and-locking-bar (not shown) extending from shaft (10) must be loosened one-half revolution; this disengages the stop-ring from the shaft. In this condition, the ring engaged by a pawl may slip while the shaft is turned; but the other stop rings, which are not retained by pawls, will turn with the shaft and remain in the previous positions with respect to the shaft. After the dial setting is made, the stop-ring lock is again tightened, and the setup is complete.

(22) At any time this particular dial setting is again required, the channel selector may be operated to choose the proper channel number and the process just described will be repeated. The motor will turn the cam drum to the proper position while at the same time shaft (10) and the stop-ring drum are halted in preparation for the remaining half-cycle. The motor reverses and turns shaft (10) clockwise until the pawl toe drops into the slot in its stop-ring. Shaft (10) is then in exactly the desired position and so is the shaft of the element being positioned.

(23) As before, the motor will continue to run slipping clutch (9) until the control unit stops it - but the shaft will remain in the desired position. Dial settings may be made at any time, but during automatic cycling the stop-ring lock must be tight. If it is not, during the first half-cycle one of the pawl toes may fall into a stop-ring as the pawl heel passes over its cam-drum slot. If that particular channel had previously been set, the setting will be changed as the ring is moved. If the lock is tight, the setting will not be disturbed. The stop ring drum will stop momentarily and the clutch will slip until the pawl heel is pushed from its slot in the cam drum.

d. CONTROL UNIT.—In operation, a channel is selected by dialing a desired number from one to ten. This operation causes K-612 *(figure 2-18.)* to set up the channel line to the seeking switch S-1104 and it in turn completes the circuit to the control unit. The control unit is the mechanism that sets the motor and the autotune elements in motion and permits the selection of the right combination of mechanical sequences that will end up with the heads positioned at the channel number dialed. The control unit complement is listed in Table 2-3.

e. LIMIT SWITCH *(refer to table 2-3.)* .— The limit switch 0-1109 is mounted on the Exciter-IPA autotune casting. The contacts are immediately opened when motor B-1702 begins to rotate. When the motor has reversed and returned to the original position, the switch contacts are closed and the circuit necessary for the operation of the homing relay (p/o K-612) is completed.

f. DRIVE MOTORS.—The drive motor (B-1702) at the base of Radio Frequency Amplifier AM-1116/FRT-15B *(see figure 7-11.)* is a three-phase 220 volt AC squirrel cage induction type motor. Output is a direct drive take-off through a rigid coupling to the vertically positioned autotune drive shaft *(figure 2-18.)* . Line shafts at the Exciter-IPA, Power Amplifier, and Antenna Matching Network chassis convey the shaft motion directly to the autotune heads control unit and limit switch in this bay. The autotune drive motors B-101, and B-801 in the Radio Frequency Oscillator 0-317/FRT-15B and in the Radio Frequency Modulator MD-245/FRT-15B chassis, are of the 220 volt AC single phase induction type. Power is taken from B-101 and B-801 by separate chain and sprocket drive assemblies. These assemblies convey the power directly to the line shaft associated with each of the two chassis.

g. STEPPER MOTORS AND STEPPER SOLENOIDS.—Channel information is also carried by stepper type motors and stepper type rotary solenoid switches. The full complement of these components is given in Table 2-4.

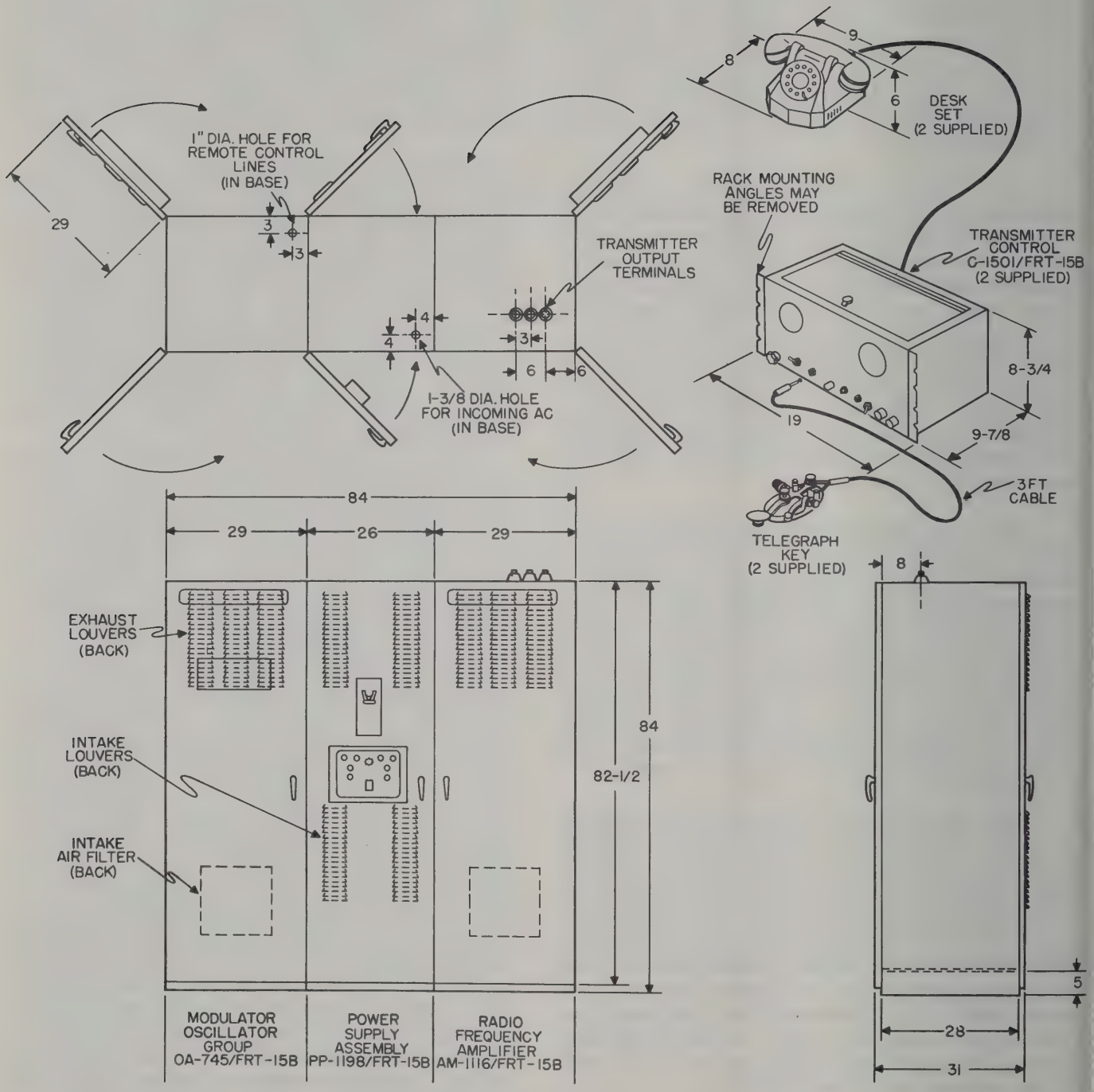


Figure 3-1. Outline and Mounting Dimensions, Radio Transmitting Set AN/FRT-15B

SECTION 3
INSTALLATION

1. UNPACKING.

a. GENERAL. — The entire equipment is packed in wooden boxes. The three large cabinets are individually crated. Test cables are packed in the bottom of Power Supply Assembly PP-1198/FRT-15B. The two Transmitter Controls are packed in individual crates. Equipment spare parts are packed in spare parts boxes enclosed in crates.

b. UNCRATING TRANSMITTER CABINETS. The three large units were crated by first tying and bracing various components in each cabinet, placing the waterproof barrier in position around each cabinet and building up the sides and top of the crate around the cabinet. In unpacking, the reverse of the crating procedure should be used. Remove the crating from the sides and top.

Note

IT WILL BE NECESSARY TO USE A HOIST OR CONSIDERABLE MANPOWER TO MOVE THE CABINETS INTO POSITION ON THE TRANSMITTER ROOM FLOOR.

When using a hoist, attach a padded sling to the wooden crate base and lift base and cabinet into position. After positioning the cabinet approximately, lift the cabinet slightly and remove the crate base. Follow the general procedure outlined below.

c. UNPACKING PROCEDURE.

(1) Place the packing case near the position in which the equipment is to be used.

(2) Remove steel straps or other corner bracing.

(3) Remove nails from the case using a nail puller.

(4) Remove sides and top of the packing case.

CAUTION

DO NOT ATTEMPT TO PRY SIDES OFF THE PACKING CASE: EQUIPMENT MAY BE DAMAGED.

(5) Remove waterproof barrier and packing materials.

(6) Remove bags of desiccant placed inside for moisture absorption.

(7) Move the cabinets into position.

CAUTION

USE EXTREME CARE IN MOVING EQUIPMENT TO AVOID DAMAGE TO CABINETS AND COMPONENTS.

(8) Remove wooden blocks, tying cords or tape, and/or packing materials from interior of cabinets.

(9) Visually inspect all units for possible signs of damage and check material received against the master packing list.

2. LOCATION AND ASSEMBLY OF EQUIPMENT.

a. LOCATION. —When selecting a permanent location for the transmitter, the following should be given consideration.

(1) Weight of equipment:—The three transmitter frames weight approximately 3,000 lbs. Make certain that the floor will support the added weight of the transmitter without strain.

(2) Space around the transmitter:—There must be adequate space in front of and behind the transmitter to allow for opening of the doors *(see figure 3-1.)* and servicing the equipment.

(3) Adequate ventilation:—The transmitter dissipates approximately 5 kw of heat when operating under full load. Cooling air is taken in near the bottom of the rear doors and exhausted at the top of the doors.

(4) Proper mounting:— The transmitter should be mounted on a level and substantial base and must not be subject to vibration from external sources.

(5) External connections:— Suitable ducts or cable trenches for the power supply cables and the remote control cables (if used) should be installed. Antenna connections should be brought in as directly as possible, and the transmission line properly supported.

b. ASSEMBLY AND MOUNTING.

(1) Mount the three cabinets side by side as shown in figure 3-1. A special foundation is not required. Cable inlets are at the base of the cabinets. Cable ducts should be laid out, and in place before the transmitter is assembled. Assemble the three cabinets in line.

CAUTION

CHECK TO ASCERTAIN THAT THE THREE LARGE CERAMIC BOWLS E-1701, E-1702 AND E-1703, WHICH ARE SHIPPED ASSEMBLED TO THE TOP OF THE RADIO FREQUENCY AMPLIFIER CABINET, HAVE NOT BEEN DAMAGED. MAKE SURE THROUGH BOLT CONNECTIONS ARE TIGHT ON ALL THREE BOWLS, AND NO SHORT CIRCUIT EXISTS BETWEEN ANTENNA TERMINAL AND CABINET

(2) Transmitter Control C-1501/FRT-15 may be used on a table or in a 19-inch relay rack. Mount the supporting side brackets on the ends of the cabinet, for rack mounting. The desk should be placed at a convenient point on the table within sight of the control front panel, and the telegraph key fastened down in a location suitable for the operator.

3. ELECTRICAL CONNECTIONS.

a. INTERUNIT CABLING. *(see figure 3-3.)*

(1) The main interconnecting cable W-1601 between the three frames is carried through the Power Supply Assembly frame.

(2) Install the main interconnecting cable as follows:

(*a*) Unpack the main interconnecting cable W-1601 and lay the center of this cable on the rear floor of the Power Supply Assembly cabinet.

(*b*) Thread first one and of the cable through the hole in the sides of the Power Supply Assembly cabinet and the Electrical Equipment Cabinet; then the other end through the hole in the Power Supply Assembly cabinet and the Radio Frequency Amplifier cabinet.

(*c*) The three cabinets are shipped with all components installed with the exception of those listed in Table 3-1. Install these components and then connect the main cable leads as shown in figure 3-3. Check to be certain that all terminal board connections are secure.

CAUTION

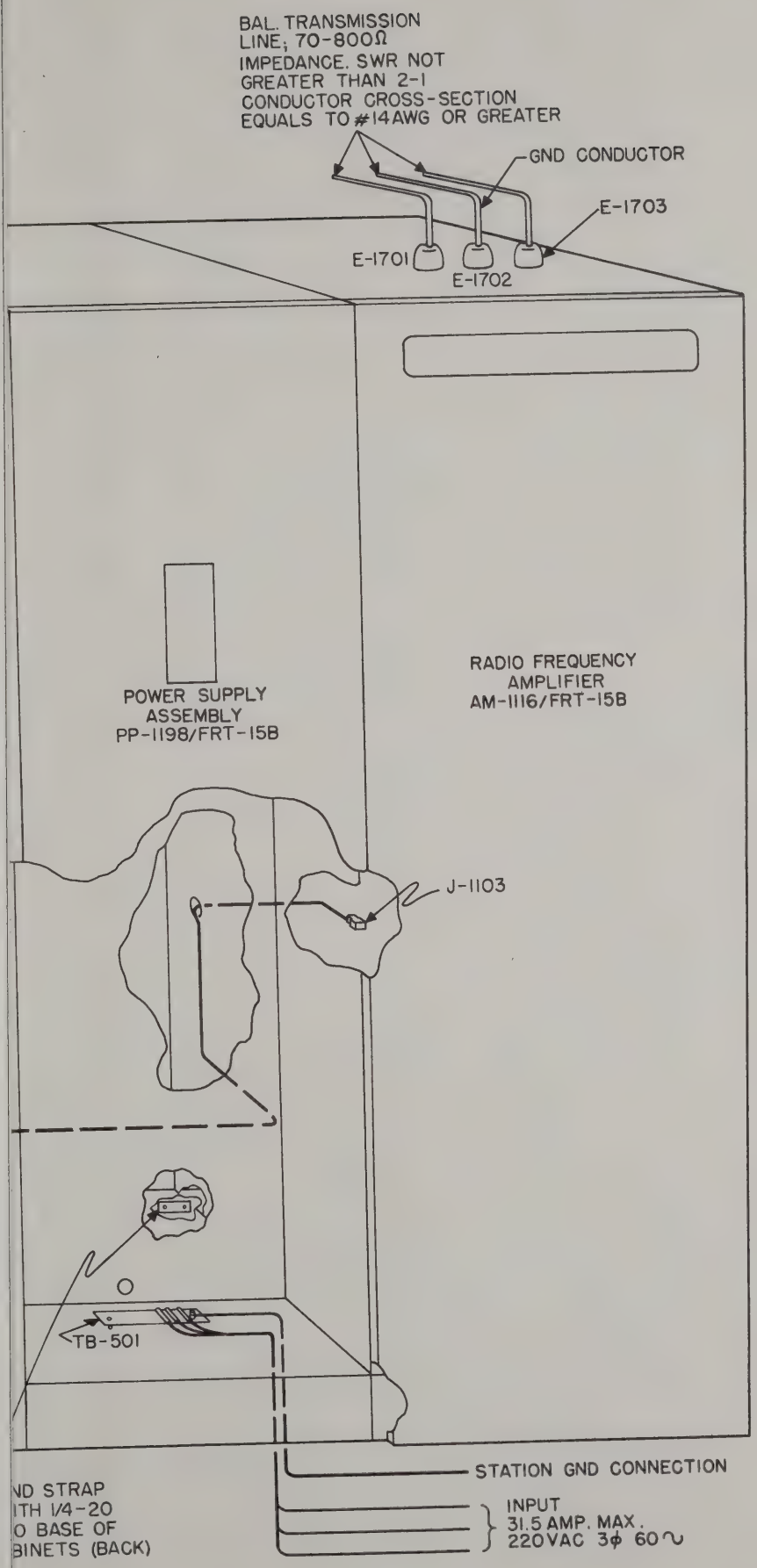
USE EXTREME CARE IN HANDLING THE TUBES (ESPECIALLY THE TYPE 4-1000A), AND THE TUBE CHIMNEYS TO PREVENT BREAKAGE AND POSSIBLE BODILY INJURY.

b. EXTERNAL CABLES *(see figure 3-2.)*

Note

ALL EXTERNAL CONNECTIONS, EXCEPT ANTENNA RF TRANSMISSION LINE ARE BROUGHT THROUGH THE BOTTOM OF THE CABINETS TO THE TERMINAL BOARDS.

(1) PRIMARY POWER CONNECTION.— Run the three phase 220 volt AC line from the station switch to TB-501 in the front bottom of



al Cabling, Radio Transmitting Set AN/FRT-15B

(3) Adequate ventilation:—The transmitter dissipates approximately 5 kw of heat when operating under full load. Cooling air is taken in near the bottom of the rear doors and exhausted at the top of the doors.

(4) Proper mounting:— The transmitter should be mounted on a level and substantial base and must not be subject to vibration from external sources.

(5) External connections:— Suitable ducts or cable trenches for the power supply cables and the remote control cables (if used) should be installed. Antenna connections should be brought in as directly as possible, and the transmission line properly supported.

b. ASSEMBLY AND MOUNTING.

(1) Mount the three cabinets side by side as shown in figure 3-1. A special foundation is not required. Cable inlets are at the base of the cabinets. Cable ducts should be laid out, and in place before the transmitter is assembled. Assemble the three cabinets in line.

CAUTION

CHECK TO ASCERTAIN THAT THE THREE LARGE CERAMIC BOWLS E-1701, E-1702 AND E-1703, WHICH ARE SHIPPED ASSEMBLED TO THE TOP OF THE RADIO FREQUENCY AMPLIFIER CABINET, HAVE NOT BEEN DAMAGED. MAKE SURE THROUGH BOLT CONNECTIONS ARE TIGHT ON ALL THREE BOWLS, AND NO SHORT CIRCUIT EXISTS BETWEEN ANTENNA TERMINAL AND CABINET

(2) Transmitter Control C-1501/FRT-15 may be used on a table or in a 19-inch relay rack. Mount the supporting side brackets on the ends of the cabinet, for rack mounting. The desk should be placed at a convenient point on the table within sight of the control front panel, and the telegraph key fastened down in a location suitable for the operator.

3. ELECTRICAL CONNECTIONS.

a. INTERUNIT CABLING. *(see figure 3-3.)*

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(*b*) Thread first one and of the cable through the hole in the sides of the Power Supply Assembly cabinet and the Electrical Equipment Cabinet; then the other end through the hole in the Power Supply Assembly cabinet and the Radio Frequency Amplifier cabinet.

(*c*) The three cabinets are shipped with all components installed with the exception of those listed in Table 3-1. Install these components and then connect the main cable leads as shown in figure 3-3. Check to be certain that all terminal board connections are secure.

CAUTION

USE EXTREME CARE IN HANDLING THE TUBES (ESPECIALLY THE TYPE 4-1000A), AND THE TUBE CHIMNEYS TO PREVENT BREAKAGE AND POSSIBLE BODILY INJURY.

b. EXTERNAL CABLES *(see figure 3-2.)*

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ALL EXTERNAL CONNECTIONS, EXCEPT ANTENNA RF TRANSMISSION LINE ARE BROUGHT THROUGH THE BOTTOM OF THE CABINETS TO THE TERMINAL BOARDS.

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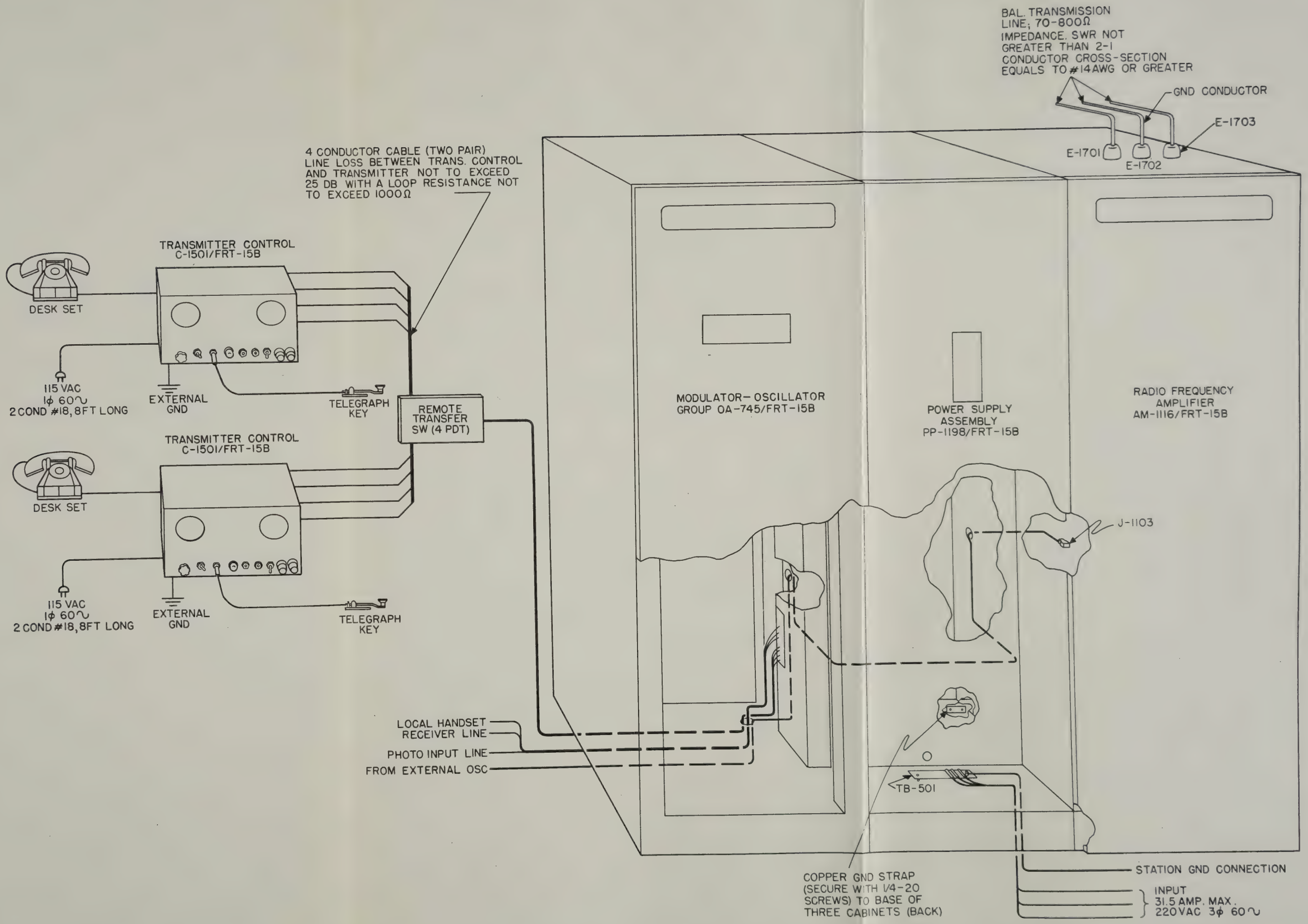
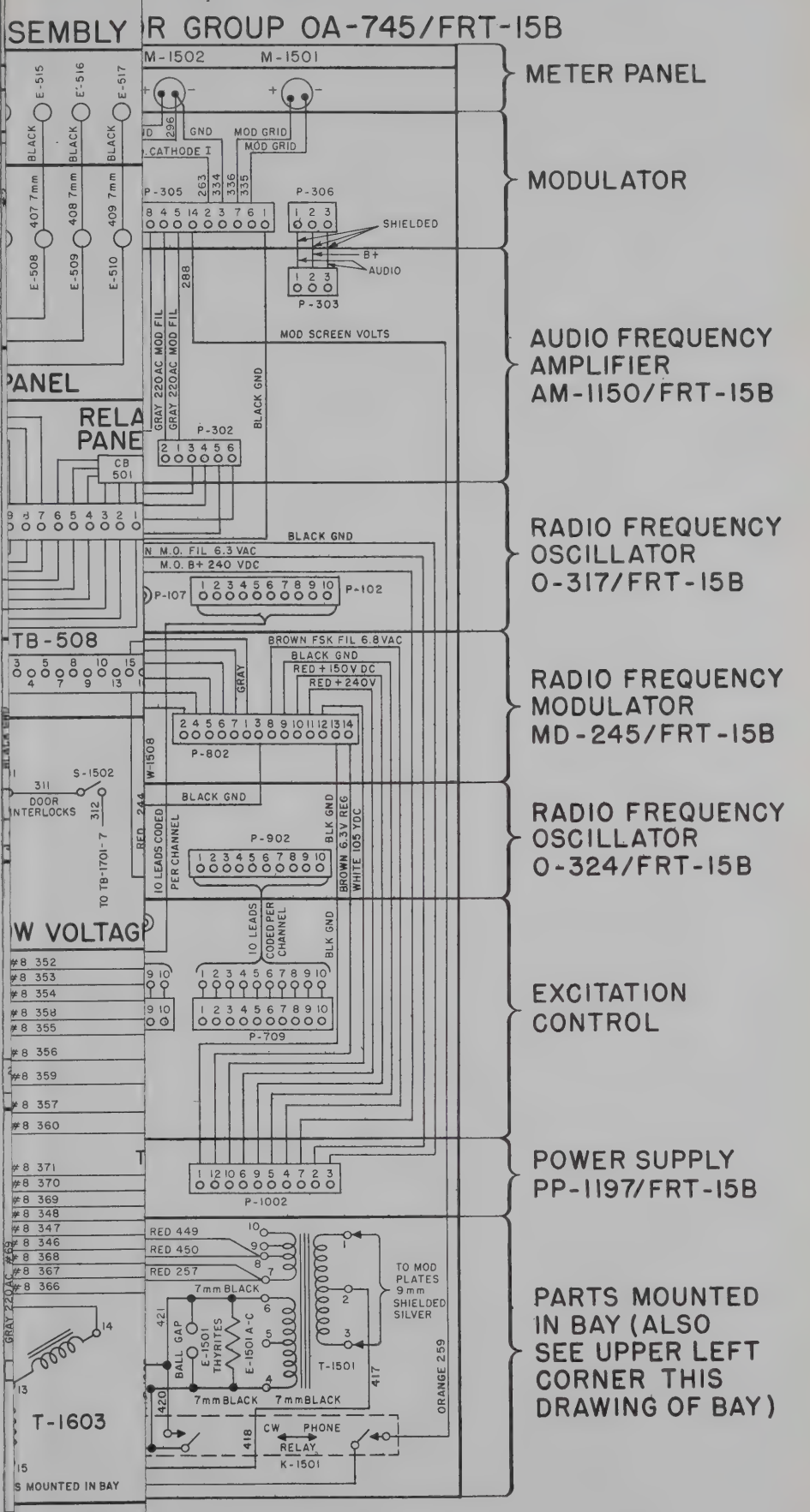
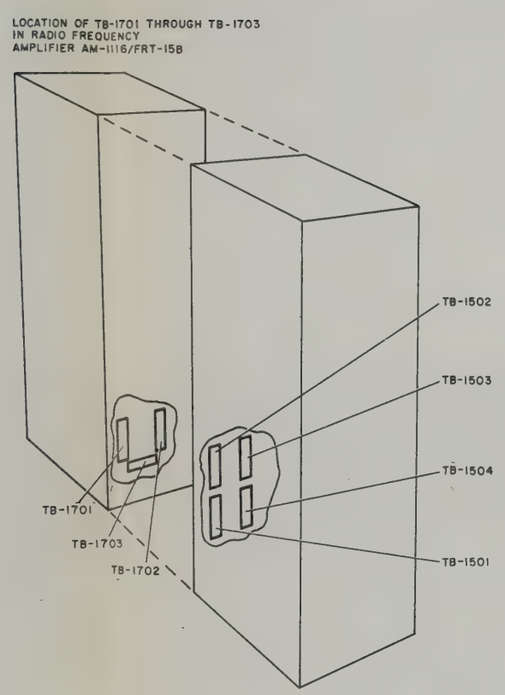


Figure 3-2. External Cabling, Radio Transmitting Set AN/FRT-15B



Diagram, Radio Transmitting Set AN/FRT-15B

RADIO FREQUENCY AMPLIFIER AM-1116/FRT-15B



LOCATION OF TB-1701 THROUGH TB-1703
IN RADIO FREQUENCY
AMPLIFIER AM-1116/FRT-15B

LOCATION OF TB-1501 THROUGH TB-1504
IN MODULATOR-OSCILLATOR
GROUP OA-745/FRT-15B

BOARD	NOS
TB-1501	1-20
TB-1502	21-40
TB-1503	41-60
TB-1504	61-80
TB-1701	1-20
TB-1702	21-40
TB-1703	41-46

NOTE:

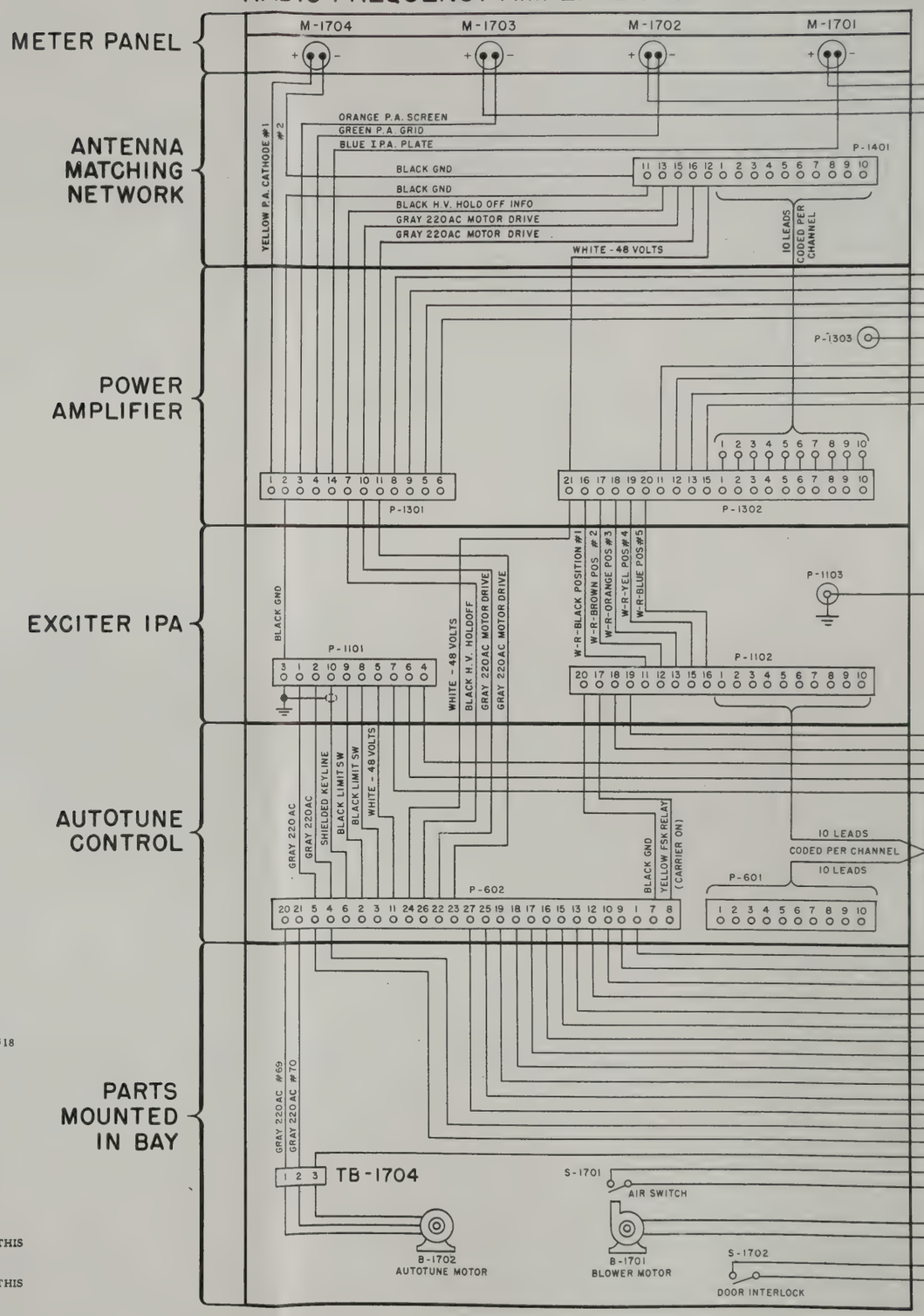
a. UNLESS OTHERWISE NOTED WIRE IS SRIR #18

b. VIEWS ARE FROM REAR

c.
W/BLACK	--- CHANNEL NO. 1
W/BROWN	--- CHANNEL NO. 2
W/RED	--- CHANNEL NO. 3
W/ORANGE	--- CHANNEL NO. 4
W/YELLOW	--- CHANNEL NO. 5
W/BLUE	--- CHANNEL NO. 6
W/GRAY	--- CHANNEL NO. 7
W/RED/BLACK	--- CHANNEL NO. 8
W/RED/BROWN	--- CHANNEL NO. 9
W/RED/ORANGE	--- CHANNEL NO. 10

d. REFER TO PERSPECTIVE VIEW LEFT SIDE THIS DRAWING FOR LOCATION OF TB-1701/3

e. REFER TO PERSPECTIVE VIEW LEFT SIDE THIS DRAWING FOR LOCATION OF TB-1501/4



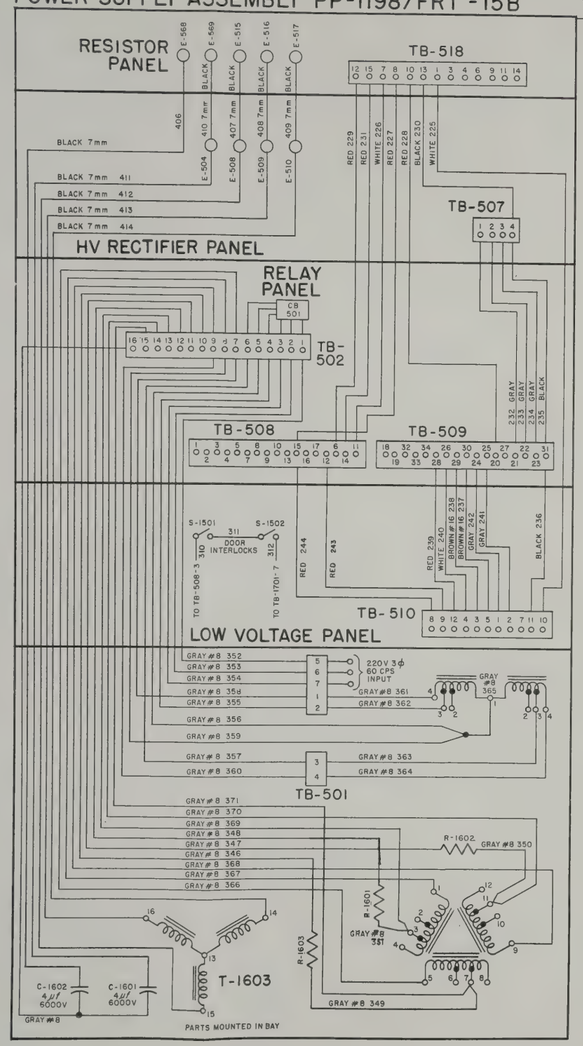
FUNCTION	COLOR	WIRE NO.	TERM NO.	WIRE NO.	CONNECT TO
1000 V DC IPA PLATE	RED	247	21	293	TB-508-13
-124 V DC P.A. BIAS	WHITE	246	26	294	TB-518-3
+360 V DC P.A. SCREEN	RED	245	23	275	TB-1504-64
P.A. RADITION SW	WHITE	21	7	312	S-1602
P.A. RADITION SW	WHITE	22	8	295	TB-1703-41
220 AC P.A. FIL.	GRAY	23	9	305	TB-509-22
220 AC P.A. FIL.	GRAY	24	10	304	TB-509-21
H.V. INPUT FROM CW RELAY IN MOD-OSC	WHITE	DIRECT TO CW RELAY MOD BAY			
FSK X1 INFO	W-R-YEL	30	1	276	TB-1504-67
FSK X2 INFO	W-R-BLUE	32	2	277	TB-1504-68
FSK X4 INFO	W-R-GRAY	33	3	278	TB-1504-69
FSK X8 INFO	W-YEL-GRN	34	4	279	TB-1504-70
R F INPUT FROM EXCITATION CONTROL CHASSIS	RG-58/U	DIRECT TO R F SWITCHING UNIT			
REMOTE CHANNEL INFO	RED	49	24	280	TB-1502-37
SQUELCH BIAS TO AUDIO FREQ AMP.	WHITE	50	30	281	TB-1502-30
IPA B+ 500 V DC P.S.	RED	53	22	298	TB-508-14
IPA BIAS -400 V DC P.S.	WHITE	54	25	299	TB-510-10
4-65A BIAS -60 V DC	WHITE	55	27	300	TB-518-4
1 - CHANNEL NO. 1	W-BLACK	39-76	31	265	TB-1504-80
2 - CHANNEL NO. 2	W-BROWN	40-77	32	266	TB-1504-79
3 - CHANNEL NO. 3	W-RED	41-78	33	267	TB-1504-78
4 - CHANNEL NO. 4	W-ORANGE	42-79	34	268	TB-1504-77
5 - CHANNEL NO. 5	W-YELLOW	43-80	35	269	TB-1504-76
6 - CHANNEL NO. 6	W-BLUE	44-81	36	270	TB-1504-75
7 - CHANNEL NO. 7	W-GRAY	45-82	37	271	TB-1504-74
8 - CHANNEL NO. 8	W-R-BLACK	46-83	38	272	TB-1504-73
9 - CHANNEL NO. 9	W-R-BROWN	47-84	39	273	TB-1504-72
10 - CHANNEL NO. 10	W-R-OR	48-85	40	274	TB-1504-71
-48 V XTAL OSC & CHANNEL REPEATER	WHITE	66	28	282	TB-1503-55
HOLDING GND TO CW RELAY	BLACK	71	15	283	TB-1503-53
M C W OPERATE GND	BLACK	87	19	284	TB-1502-28
M C W HOLDING GND	BLACK	72	16	285	TB-1502-29
PLATE CONTROL TO LOCAL REMOTE	BLACK	73	17	286	TB-1502-26
DIAL LINE FROM AUDIO FREQ AMP.	BLACK	74	11	287	TB-1502-24
-48 V INPUT FROM P.S.	WHITE	67	29	301	TB-508-4
KEYLINE TO AUDIO FREQ AMP.	SHIELDED	64	5	288	TB-1501-15
KEYLINE TO FSK INPUT	SHIELDED	65	6	289	TB-1501-14
REMOTE FIL TO P.S.	GRAY	68	13	302	TB-509-33
OVERLOAD RELAY RESET	BLACK	75	12	303	TB-508-8
REMOTE FIL. OFF RELAY TO S.A.	GRAY	86	18	290	TB-1501-16
220 AC INPUT P.S.	GRAY	62	10	304	TB-509-21
220 AC INPUT P.S.	GRAY	63	9	305	TB-509-22
220 AC INPUT P.S.	GRAY	250	14	306	TB-509-23
220 AC AIR SWITCH	GRAY	251	43	307	TB-508-9
220 AC AIR SWITCH	GRAY	252	44	291	TB-1504-63
220 AC BLOWER	GRAY	253	45	308	TB-508-17
220 AC BLOWER	GRAY	254	46	309	TB-509-18
-48 V DOOR INTERLOCK	WHITE	248	41	295	TB-1701-8
-48 V DOOR INTERLOCK	WHITE	249	42	292	TB-1502-40

SEE NOTE d.

6/FRT-15B	FUNCTION	COLOR	WIRE NO.	TERM NO.	WIRE NO.	CONNECTED TO
M-1701	1000 V DC IPA PLATE	RED	247	21	293	TB-508-13
	−124 V DC P.A. BIAS	WHITE	246	26	294	TB-518-3
	+360 V DC P.A. SCREEN	RED	245	23	275	TB-1504-64
P-1401						
10 LEADS CODED PER CHANNEL						
	P.A. RADITION SW	WHITE	21	7	312	S-1602
	P.A. RADITION SW	WHITE	22	8	295	TB-1703-41
	220 AC P.A. FIL.	GRAY	23	9	305	TB-509-22
	220 AC P.A. FIL.	GRAY	24	10	304	TB-509-21
P-1303	H.V. INPUT FROM CW RELAY IN MOD-OSC WHITE DIRECT TO CW RELAY MOD BAY					
	FSK X1 INFO	W-R-YEL	30	1	276	TB-1504-67
	FSK X2 INFO	W-R-BLUE	32	2	277	TB-1504-68
	FSK X4 INFO	W-R-GRAY	33	3	278	TB-1504-69
	FSK X8 INFO	W-YEL-GRN	34	4	279	TB-1504-70
P-1103	R F INPUT FROM EXCITATION CONTROL CHASSIS RG-58/U DIRECT TO R F SWITCHING UNIT					
P-1102						
	REMOTE CHANNEL INFO	RED	49	24	280	TB-1502-37
	SQUELCH BIAS TO AUDIO FREQ AMP.	WHITE	50	30	281	TB-1502-30
	IPA B+ 500 V DC P.S.	RED	53	22	298	TB-508-14
	IPA BIAS −400 V DC P.S.	WHITE	54	25	299	TB-510-10
	4-65A BIAS −60 V DC	WHITE	55	27	300	TB-518-4
10 LEADS CODED PER CHANNEL	1 - CHANNEL NO. 1	W-BLACK	39-76	31	265	TB-1504-80
	2 - CHANNEL NO. 2	W-BROWN	40-77	32	266	TB-1504-79
	3 - CHANNEL NO. 3	W-RED	41-78	33	267	TB-1504-78
	4 - CHANNEL NO. 4	W-ORANGE	42-79	34	268	TB-1504-77
	5 - CHANNEL NO. 5	W-YELLOW	43-80	35	269	TB-1504-76
	6 - CHANNEL NO. 6	W-BLUE	44-81	36	270	TB-1504-75
	7 - CHANNEL NO. 7	W-GRAY	45-82	37	271	TB-1504-74
	8 - CHANNEL NO. 8	W-R-BLACK	46-83	38	272	TB-1504-73
	9 - CHANNEL NO. 9	W-R-BROWN	47-84	39	273	TB-1504-72
10 LEADS	10 - CHANNEL NO. 10	W-R-OR	48-85	40	274	TB-1504-71
	−48 V XTAL OSC & CHANNEL REPEATER	WHITE	66	28	282	TB-1503-55
	HOLDING GND TO CW RELAY	BLACK	71	15	283	TB-1503-53
	M C W OPERATE GND	BLACK	87	19	284	TB-1502-28
	M C W HOLDING GND	BLACK	72	16	285	TB-1502-29
	PLATE CONTROL TO LOCAL REMOTE	BLACK	73	17	286	TB-1502-26
	DIAL LINE FROM AUDIO FREQ AMP.	BLACK	74	11	287	TB-1502-24
	−48 V INPUT FROM P.S.	WHITE	67	29	301	TB-508-4
	KEYLINE TO AUDIO FREQ AMP.	SHIELDED	64	5	288	TB-1501-15
	KEYLINE TO FSK INPUT	SHIELDED	65	6	289	TB-1501-14
	REMOTE FIL TO P.S.	GRAY	68	13	302	TB-509-33
	OVERLOAD RELAY RESET	BLACK	75	12	303	TB-508-8
	REMOTE FIL. OFF RELAY TO S.A.	GRAY	86	18	290	TB-1501-16
	220 AC INPUT P.S.	GRAY	62	10	304	TB-509-21
	220 AC INPUT P.S.	GRAY	63	9	305	TB-509-22
	220 AC INPUT P.S.	GRAY	250	14	306	TB-509-23
	220 AC AIR SWITCH	GRAY	251	43	307	TB-508-9
	220 AC AIR SWITCH	GRAY	252	44	291	TB-1504-63
	220 AC BLOWER	GRAY	253	45	308	TB-508-17
	220 AC BLOWER	GRAY	254	46	309	TB-509-18
1702						
	−48 V DOOR INTERLOCK	WHITE	248	41	295	TB-1701-8
INTERLOCK	−48 V DOOR INTERLOCK	WHITE	249	42	292	TB-1502-40

SEE NOTE d.

POWER SUPPLY ASSEMBLY PP-1198/FRT-15B



CONNECTED TO	WIRE NO. (INSIDE)	TERM NO.	WIRE NO. (OUTSIDE)	COLOR	FUNCTION
TB-518-11	337	41	264	RED	D.C. VOLTS FOR K, V, METER
TB-1501-20	460	23	328	GRAY	220 AC FOR SERVICE METER
TB-1501-19	457	22	333	GRAY	220 AC FOR SERVICE METER
TB-1702-30	281	30	151	WHITE	SQUELCH BIAS FROM I.P.A.
REC. LINE		6	150	SHIELDED	REC. LINE INPUT
TB-1701-11	287	24	149	BLACK	DIAL LINE TO ATCU
REMOTE CONTROL LINES		5	152	SHIELDED	REMOTE KEY LINE
		4	148	SHIELDED	REMOTE DIAL LINE
		3	147	SHIELDED	REMOTE AUDIO LINE
		2	146	SHIELDED	REMOTE AUDIO LINE
TB-508-7	317	25	154	BLACK	REMOTE PLATE FROM PLATE RELAY
TB-1701-17	286	26	155	BLACK	REMOTE PLATE TO MOTOR START
TB-509-32	329	27	156	BLACK	REMOTE PLATE FROM START-STOP
TB-1502-45	339	31	157	WHITE	− 48 V DC SOLID
TB-1502-33	455				
TB-1701-19	284	28	158	BLACK	MCW OPERATE GND
TB-1701-18	290	16	159	GRAY	REMOTE FIL OFF RELAY
TB-1503-51	345	17	160	GRAY	REMOTE FIL 220 AC SOLID
TB-509-34	330				
TB-508-10	318	18	161	GRAY	REMOTE FIL TO FIL RELAY
TB-1702-24	280	37	162	RED	REMOTE CHANNEL INFO.
TB-518-9	332	36	163	RED	+ 20 VOLTS MIC. SUPPLY
TB-1701-16	285	29	164	BLACK	MCW HOLDING GND
TB-1701-5	288	15	153	SHIELDED	KEYLINE TO ATCU
TB-510-7	322	35	180	WHITE	− 127 V DC MOD. BIAS
TB-1502-22	457	19	167	GRAY	220 V AC S.A. & MOD. FIL
TB-1503-48	458				
TB-1503-44	459	20	168	GRAY	220 V AC S.A. & MOD. FIL
TB-1502-23	460				
TB-1503-61	456	38	16	RED	SPEECH AMP. B+ 500 V DC
TB-518-6	331	32	170	WHITE	LIMITER BIAS − 45 V MAX.
TB-1502-31	455	33	173	WHITE	− 48 V DC SOLID
TB-1502-34	342				
TB-1503-54	343	34	176	WHITE	− 48 V DC SOLID
TB-1502-33	342				
TB-1501-20	459	44	171	GRAY	220 V AC MO AUTOTUNE
TB-1503-49	464				
TB-1503-58	463	43	172	GRAY	220 V AC MO AUTOTUNE
TB-1503-46	461	21	174	GRAY	110 V AC MO OVEN
TB-1503-47	462	42	175	GRAY	110 V AC MO OVEN GND SIDE
TB-1503-57	465	49	144	GRAY	220 AC FSK AUTOTUNE
TB-1503-64	464				
TB-1501-19	458	48	143	GRAY	220 AC FSK AUTOTUNE
TB-509-21	325				
TB-508-2	314	47	142	GRAY	110 V AC FSK OVEN
TB-1503-42	462				
TB-508-1	313	46	141	GRAY	110 V AC FSK OVEN
TB-1502-21	461				
TB-1502-31	339	45	140	WHITE	− 48 V DC SOLID
PHOTO INPUT		7	103	SHIELDED	PHOTO FSK INPUT
		1	104	BLACK	GROUND
TB-1701-6	289	14	105	SHIELDED	KEYLINE FSK INPUT
TB-1701-1	276	67	135	W-R-YEL	FSK X1 INFO
TB-1701-2	277	68	136	W-R-BLUE	FSK X2 INFO
TB-1701-3	278	69	137	W-R-GRAY	FSK X4 INFO
TB-1701-4	279	70	138	W-Y-GRN	FSK X8 INFO
TB-1504-62	466	52	131	GRAY	220 V AC XTAL FIL
TB-1501-17	345	51	130	GRAY	220 V AC XTAL FIL
TB-508-4	315	56	91	WHITE	− 48 V DC SOLID
TB-1503-54	344				
TB-1702-28	282	55	132	WHITE	− 48 V DC FROM ATCU
TB-508-14	320	61	134	RED	XTAL B + 500 V DC
TB-1502-38	456				
DIRECT TO P-1103		EXCITER	RG 58/U		RF SIGNAL TO EXCITER W-1509
TB-1503-54	344	56	91	WHITE	− 48 V DC SOLID
TB-508-4	315				
TB-1702-28	282	55	90	WHITE	− 48 V DC FROM ATCU
TB-1702-31	265	80	92	W-BLACK	CHANNEL NO. 1 − 1
TB-1702-32	266	79	93	W-BROWN	CHANNEL NO. 2 − 2
TB-1702-33	267	78	94	W-RED	CHANNEL NO. 3 − 3
TB-1702-34	268	77	95	W-ORANGE	CHANNEL NO. 4 − 4
TB-1702-35	269	76	96	W-YELLOW	CHANNEL NO. 5 − 5
TB-1702-36	270	75	97	W-BLUE	CHANNEL NO. 6 − 6
TB-1702-37	271	74	98	W-GRAY	CHANNEL NO. 7 − 7
TB-1702-38	272	73	99	W-R-BLCK	CHANNEL NO. 8 − 8
TB-1702-39	273	72	100	W-R-BRWN	CHANNEL NO. 9 − 9
TB-1702-40	274	71	101	W-R-ORNG	CHANNEL NO. 10 − 10
TB-509-23	327	58	89	GRAY	220 V AC P.S. PP-1197/FRT-15B
TB-1503-43	463				
TB-509-22	326	57	88	GRAY	220 V AC P.S. PP-1197/FRT-15B
TB-1503-49	465				
TB-1503-52	466				
TB-508-16	321	62	447	GRAY	220 V AC AIR SW
TB-1703-44	341	63	448	GRAY	220 V AC AIR SW
TB-1703-42	292	40	339	WHITE	− 48 V DC DOOR INTERLOCK
TB-508-5	316	39	340	WHITE	− 48 V DC DOOR INTERLOCK
TB-509-18	323	59	453	GRAY	220 V AC BLOWER
TB-509-19	324	60	454	GRAY	220 V AC BLOWER
DIRECT TO — P.A. — P-1303				WHITE HV	POWER AMP PLATE H.V. LEAD
DIRECT TO — C-1602			423	7mm BLCK	P.S. PLATE DROPPING RES
TB-1702-23	275	64	450	RED	POWER AMP SCREEN
TB-1503-56	343	54	256	WHITE	− 48 V DC SOLID
TB-1701-15	283	53	255	BLACK	HOLDING GND FROM ATCU
TB-518-14	338	65	257	RED	P. A. SCREEN V FROM P.S.
DIRECT TO — C-1601			418	7mm BLCK	+4200 V DC FROM PR-1198/FRT-15B
TB-508-13	319	66	258	ORANGE	MOD SCREEN − 960 V DC

SEE NOTE c.

MODULATOR OSCILLATOR GROUP OA-745/FRT-15B

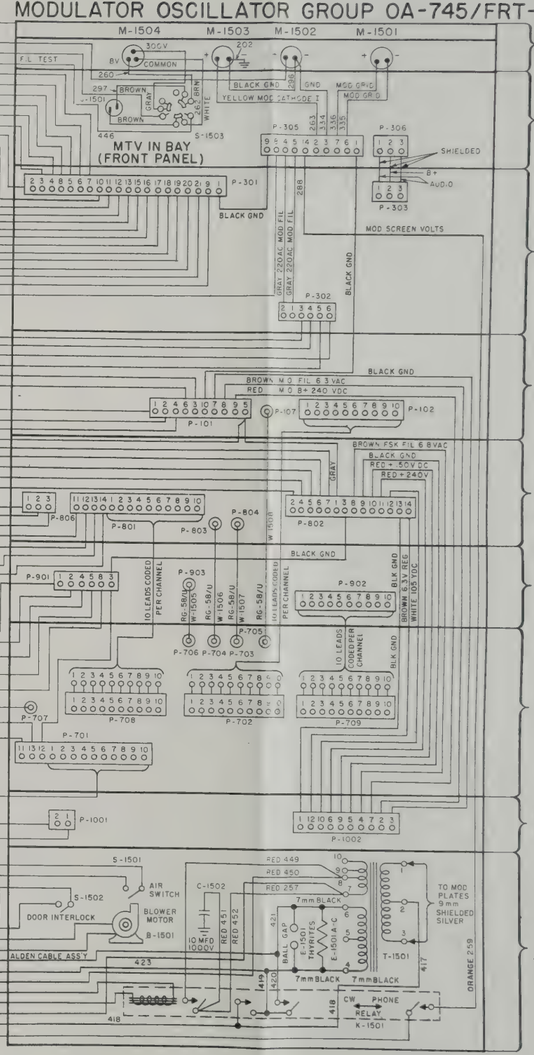


Figure 3-3. Interconnection Diagram, Radio Transmitting Set AN/FRT-15B

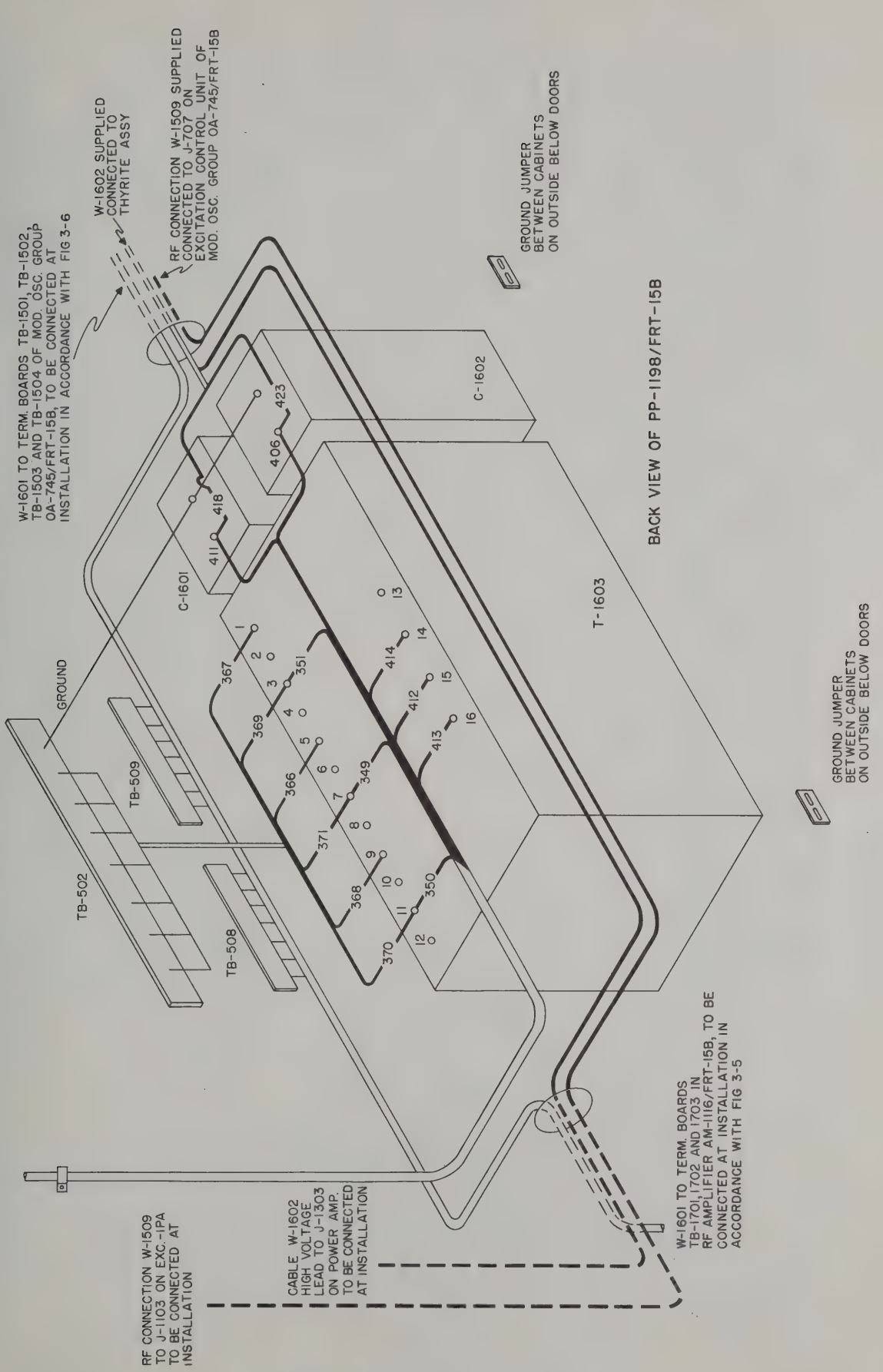


Figure 3-4. Installation of Transformer and Interconnection Cables

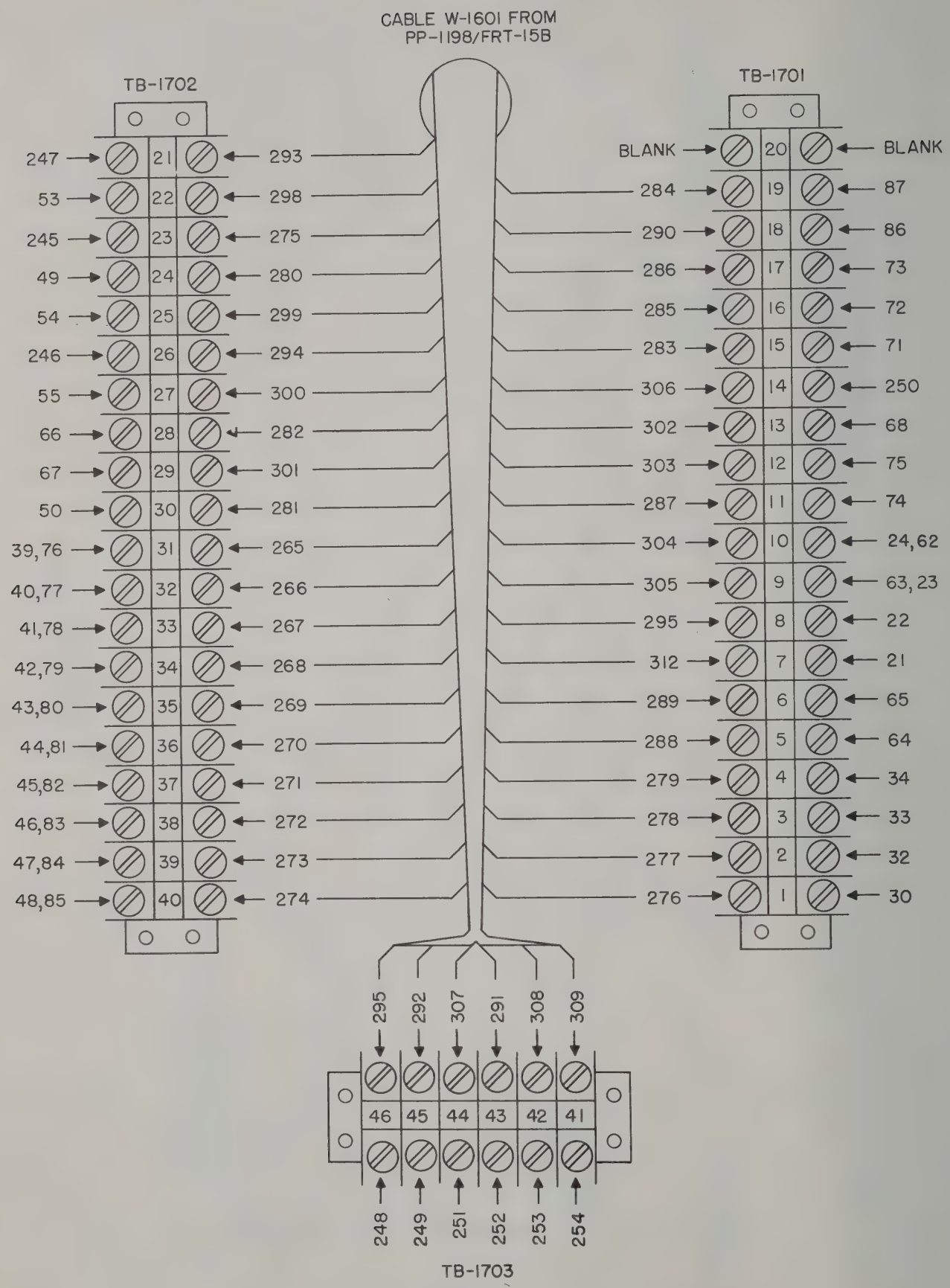


Figure 3-5. Cable Installation of W-1601 to RF Bay Terminal Boards

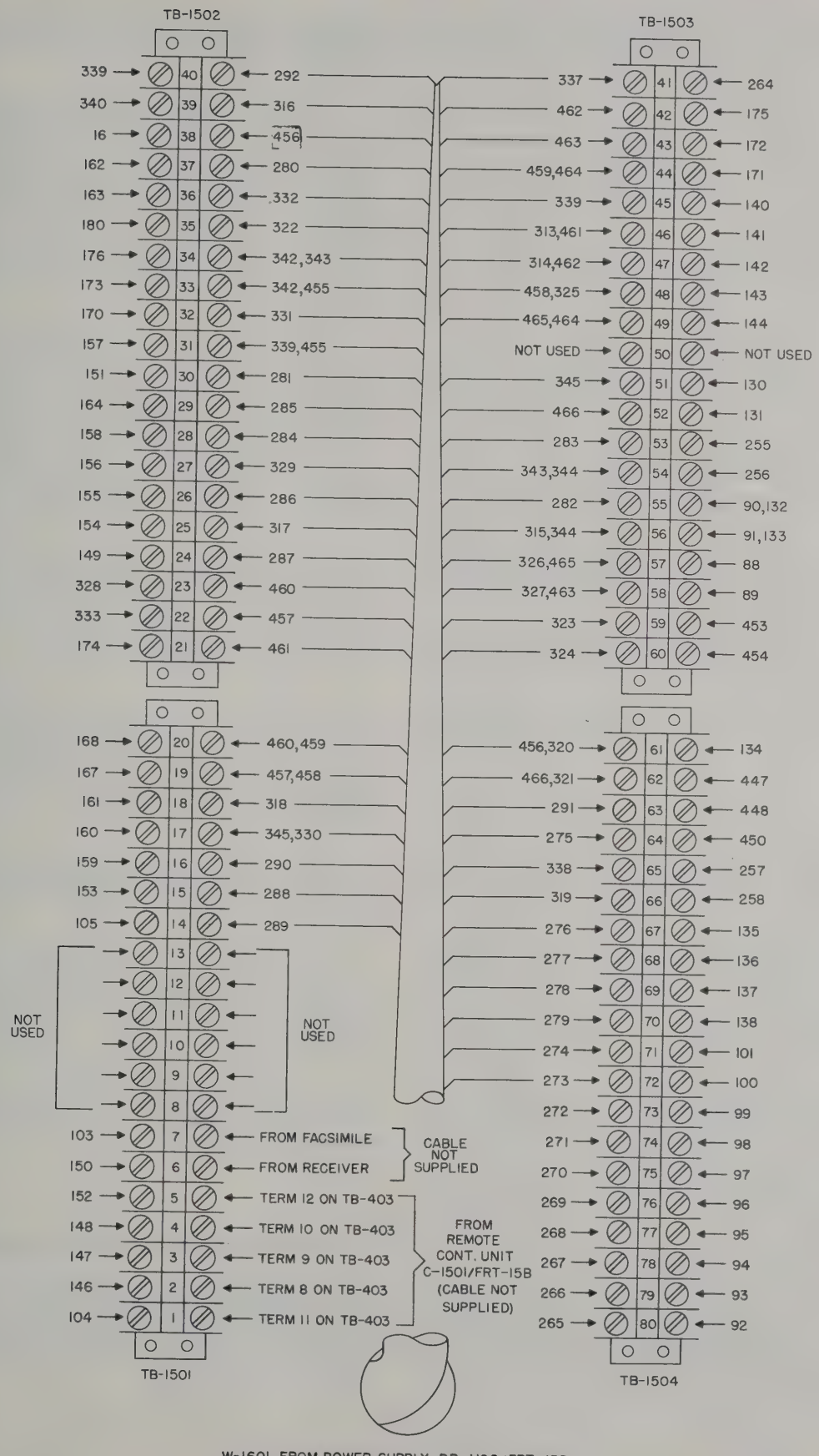


Figure 3-6. Cable Installation of W-1601 to Modulator Bay Terminal

Power Supply Assembly PP-1198/FRT-15B. This cable is not supplied as part of the equipment contract. Refer to following data for recommended installation.

Cable Feet	Cable Size	Cable Diam. (In.)	Conduit (In.)
50	THFA-14	0.968	1-1/2
100	THFA-30	1.168	2
150	THFA-40	1.232	2

(2) REMOTE CONTROL LINES. —When remote control of the transmitter is desired, run the remote control cable into the bottom of the Modulator-Oscillator Group OA-745/FRT-15B. Connect the remote end of the four line conductor cable to the terminal board at the rear of Transmitter Control C-1501/FRT-15B. If two remote control stations are contemplated, a remote transfer switch (four pole double throw) should be installed at some convenient point. This switch is not furnished as part of the equipment contract. A power cord and attached plug are furnished with each of the two Transmitter Control units. Insert the plug(s) in a 110 volt 50-60 cps single phase source. Connect the desk set and/or key to the Transmitter Control unit(s) as shown in figure 7-69. (Note recommended loop resistance.)

(3) CONNECTION OF AN EXTERNAL OSCILLATOR. —When an external oscillator (not furnished with the equipment) is to be used as a frequency source, run the shielded oscillator output cable up through the bottom of the Modulator-Oscillator Group and via the Power Supply Assembly PP-1198/FRT-15B into the Radio Frequency Amplifier AM-1116/FRT-15B cabinet. There, connect the cable to J-1103 on the top rear of the Exciter IPA unit.

(4) PHOTO INPUT LINE. —Run a shielded line from the external phototransmission or facsimile equipment into the bottom of the Modulator Oscillator Group OA-745/FRT-15 and connect it to terminal No. 7 of TB-1501. Material for this line is not furnished. Use the shield for ground connection to TB-1501, terminal one.

(5) STATION GROUND CONNECTION. — Connect the station ground lead to the stud marked "GROUND" on the bottom front of the Power Supply Assembly PP-1198/FRT-15B. Bring the lead up through the hole provided in the base of this bay.

(6) ANTENNA TRANSMISSION LINE. —Connect a balanced RF transmission line to terminals E-1701 and E-1703. Terminal E-1702 is grounded. These terminals are on feed-through insulators on top of the Radio Frequency Amplifier AM-1116/FRT-15B cabinet. When installing the transmission line, consideration must be given to the following:

(*a*) If antenna RF ammeters are used, install them as close to the transmitter terminals as possible and use copper strap or tubing for connection. For lines having impedance between 70 and 200 ohms, use RF ammeters having 8 or 10 ampere scales; for lines having impedance of 200 ohms or above, use 5 ampere meters.

(*b*) For open wire transmission lines, use No. 8 hard-drawn wire. Space them properly for the desired impedance, for example, eight inches apart for a transmission line impedance of approximately 600 ohms.

(*c*) If coaxial transmission line is used, make sure it is rated to carry the required RF power. When two coaxial cables are used for a balanced line, connect the shields (ground) to terminal E-1702.

(*d*) Maintain a clearance of approximately three feet between transmission lines and the top of the transmitter cabinet.

(*e*) Use sufficient ceramic insulators for rigid support of open wire lines and use Pyrex or high quality ceramic feed-through insulators through building walls.

(*f*) When more than one antenna is used, install patching plugs and jacks for the various transmission lines.

4. PRELIMINARY CHECKS AND ADJUSTMENTS.

a. GENERAL. — After the transmitter has been installed and the wiring connections made, the checks in the following paragraphs b. and c. should be made.

TABLE 3-1. COMPONENTS TO BE INSTALLED UPON RECEIPT OF AN/FRT—15B

SYMBOL NO.	COMPONENT	LOCATION
T-1603	HV plate transformer	Base (rear) of Power Supply Assembly PP-1198/FRT-15B *(see figure 7-11.)*
V-518 through V523	Regulators	Front of Power Supply Assembly PP-1198/FRT-15B *(see figure 7-10.)*
V-536 through V-541	HV rectifiers	Front of Power Supply Assembly PP-1198/FRT-15B *(see figure 7-10.)*
V-530 through V-535	Plate and screen rectifiers	Front of Power Supply Assembly PP-1198/FRT-15B *(see figure 7-10.)*
V-309 V-310	Modulators	Modulator chassis *(see figure 7-14.)*
V-1301 V-1302	Power amplifiers	Power Amplifier chassis *(see figure 7-44.)*
O-309 O-310	Chimneys	Modulator chassis *(see figure 7-14.)*
O-1321 O-1322	Chimneys	Power Amplifier chassis *(see figure 7-44.)*
HS-401	Desk Sets (2)	Rear of Transmitter Control C-1501/FRT-15B *(see figure 7-54.)*
W-1509	Cable	RF interconnecting cable *(see figure 3-4.)*
W-1601	Cable	Main interconnecting cable *(see figures 3-4., 3-5., 3-6.)*
W-1602	Cable	High voltage interconnecting cable *(see figure 3-4.)*

Note

REFER TO TABLE 1-2 "EQUIPMENT REQUIRED BUT NOT SUPPLIED". IN PARTICULAR PAY ATTENTION TO CRYSTALS Y-901 THROUGH Y-910 (SHOWN INSTALLED IN FIGURE 7-33).

b. AUTOTUNE SYNCHRONIZATION *(see figure 2-18.)* .

(1) With all power off perform the checks given in paragraphs (2) through (6), following.

(2) Open the lower hinged door on the Exciter IPA unit and observe the channel position number on the control unit, 0-1114, dial. Autotune units were synchronized at factory and may be found resting on any one of 10 channels.

(3) Inspect the indicated pawl(s) *(see figure 2-17.)* on all autotune heads in the Radio Frequency Amplifier AM-1116/FRT-15B bay to check that they have just dropped in their respective slots in the drums. (Refer to Table 2-2, units 0-1112, 0-1332, 0-1333, 0-1426, 0-1427, and 0-1427A).

(4) If the indicated pawl(s) does not drop in the drum slot, refer to section 7 paragraph 4 "Autotune Synchronization", for the remedy. Check the position of all pawls in this cabinet, and be certain that the channel indicator is still where it should be.

(5) Next, loosen the locking bar in the center of each autotune head control knob. Do this to all heads *(refer to table 2-2.)* .

(6) One at a time, turn each control knob 180 clockwise degrees and check the pawls to be certain that they engage the drum. Lock the head by turning the locking bar clockwise and try to operate the unit by turning the control knob. If the pawls are properly seated, it should not be possible to move the control knob.

c. MECHANICAL CHECKS. —A complete and detailed inspection of the transmitter should be make before any power is applied. Cover the following features:

(1) Check connections:—All plug and jack connections should be tight. Terminal screws on terminal boards should be tight.

(2) Tubes properly seated in sockets:—Tubes seated properly, clamps or shields tight and top connections tight.

(3) Fuses in fuseholders:—Fuses should make proper contact and be of proper rating. Refer to Section 5, Table 5-2.

(4) Pilot lamps in sockets:—Remove pilot lamp caps and check that all lamps are in place and seated properly in holders.

(5) Autotune drive shaft coupling screws are tight.

(6) Relays operate satisfactorily:—Manually operate all relays to check that they are free. If required, burnish relay contacts using a burnishing tool.

(7) Insulators are clean:—Wipe dust off all insulators using a lint-free cloth.

(8) Check that meter pointers are on zero.

(9) Toggle switches operate properly.

(10) All knob type controls operate properly:--Set screws are tight and knobs rotate through proper angular range.

(11) The telephone dials:—Operate satisfactorily for each dial position.

(12) Stepping relay operates:— Manually operate the stepping relay K-612 in Autotune Control Unit *(see figure 7-51.)* to each position and check that it indexes and makes contact properly.

(13) Inspect the ground connection straps *(see figure 3-2.)* attached to the bottom back of the cabinets for tight connections.

(14) Check settings of spark gaps on plate winding of modulation transformer T-1501. Spark gap balls should be in line and spaced approximately 3/16 inch.

(15) Check the dial setting on the time delay relay, K-504 in the Power Supply Assembly *(see figure 7-11.)* for a delay of 30 seconds.

(16) Check the high voltage bleeder resistors:—See that the proper ferrule type resistors are mounted firmly in the clips on the rack at the back of the Power Supply Assembly.

(17) Check that thumb-bolts on the panel in front of the low voltage section of the Power Supply Assembly are tight.

d. ELECTRICAL CHECKS.

(1) GENERAL. —To ready the equipment for service operation, a systematic procedure should be followed. Application of power at the wrong time may result in damage to certain of the components. Therefore, the information presented in this electrical check paragraph should be read through carefully and then re-read as the steps of procedure are performed.

Note

BEFORE APPLYING POWER, READ THROUGH SECTION 4 "OPERATION" TO BECOME FAMILIAR WITH THE NAMES, LOCATIONS, AND FUNCTIONS OF THE FRONT PANEL CONTROLS. REFERENCE TO CERTAIN OF THESE CONTROLS IS MADE FREELY IN THIS PARAGRAPH. FIGURE 1-2 SHOULD BE REFERRED TO FOR LOCATION OF THE MAJOR CHASSIS.

(2) INITIAL APPLICATION OF CONTROL, FILAMENT, AND BIAS POWER.

(*a*) CONTROLS CHECK.

Note

AFTER ALL INSTALLATION CHECKS AND ADJUSTMENTS ARE COMPLETED (REFER TO PREVIOUS PARAGRAPHS IN THIS SECTION), APPLY POWER AS FOLLOWS:

Step 1.. — Operate the LOCAL-REMOTE switch to LOCAL.

Step 2.. — Operate PA PLATE VOLTAGE selector to CALIBRATE.

Step 3. —Operate MAIN CIRCUIT BREAKER switch to ON.

Step 4. —Operate FILAMENT START switch. The FILAMENT ON indicator lamp should light and after a short delay (about 30 seconds) the BIAS ON lamp should also light.

WARNING

WHEN LOCAL OPERATION IS EMPLOYED IT IS IMPORTANT THAT STEP #4 FOLLOW IMMEDIATELY (LESS THAN 10 SECONDS) AFTER STEP #3. THIS IS NECESSARY TO AVOID DAMAGE TO CONTROL RELAYS IN CONTROL UNITS O-111 IN RADIO FREQUENCY OSCILLATOR O-317/FRT-15B AND O-809 IN RADIO FREQUENCY MODULATOR MD-245/FRT-15B.

Note

BE CERTAIN ALL REAR AND THE FRONT CENTER DOORS ARE CLOSED SECURELY AND THAT THE BATTLE SHORT SWITCH IS OFF.

Note

HOLD THE FILAMENT START BUTTON IN UNTIL THE BLOWERS HAVE HAD TIME TO CIRCULATE AIR THAT IS SUFFICIENT ENOUGH TO OPERATE THE AIR STREAM INTERLOCK SWITCHES.

Step 5. —Check that OVEN indicator lamps are illuminated on the following units: Radio Frequency Oscillator O-317/FRT-15B, Radio Frequency Modulator MD-245/FRT-15B, and Radio Frequency Oscillator O-324/FRT-15B. After approximately one hour of elapsed time, these indicator lamps should cycle on and off - the elapsed time dependent on ambient temperature conditions.

Step 6. — Operate the SERVICE METER RANGE SELECTOR switch to LINE 220V AC. This switch is located about half way down the right side of the Modulator-Oscillator Group cabinet adjacent to the Radio Frequency Oscillator O-317/FRT-15B chassis. Observe the line voltage reading on the FIL-LINE TEST meter at the top of this cabinet. The reading should be approximately 220V. If necessary, adjust the terminal connections on the main line autotransformers T-509 and T-510 to correct for subnormal or abnormal line voltage condition.

WARNING

BE CERTAIN THAT ALL VOLTAGE IS REMOVED FROM 3 PHASE INPUT LINES WHEN ANY TERMINAL ADJUSTMENTS ARE MADE ON T-509 AND T-510.

These transformers are shown in figure 7-11. Refer to the schematic *(see figure 7-64.)* for terminal numbers vs voltages.

Note

A CHECK OF DOOR INTERLOCKS AND BATTLE SHORT CONDITION WILL BE MADE IN PARAGRAPH (4), BELOW.

(*b*) AUTOTUNE CHECK.

Step 1. — Operate the LOCAL-REMOTE switch on the front panel of Audio Frequency Amplifier AM-1150/FRT-15B to the LOCAL position.

Step 2. —Dial each number (1 through 10), one at a time, to check operation of autotune system. The autotune system should position itself within 15 seconds after each dialing operation is completed.

Step 3. — Operate the LOCAL-REMOTE switch to REMOTE and repeat step 2 at the transmitter control desk set(s). Observe the CHANNEL INDICATOR meter on Transmitter Control C-1501/FRT-15B to be certain the reading agrees with the dialed channel number.

(*c*) FILAMENT CHECK.

Step 1. —Check the color of the type 4-1000A tubes in the Modulator, and also in the Power Amplifier units. The color should be a bright-white.

Note

THESE TUBES SHOULD BE OBSERVED THROUGH THE WINDOWS PROVIDED IN THE MODULATOR AND IN THE POWER AMPLIFIER CHASSIS.

Step 2. — Open the Power Supply Assembly front door —

WARNING

BIAS VOLTAGE IS ON. DO NOT COME IN CONTACT WITH ANY COMPONENTS IN THIS BAY.

and observe filament glow in all glass envelope tubes not protected by shields. Operate FILAMENT STOP button and MAIN CIRCUIT BREAKER to OFF if replacement of any tube(s) is to be undertaken.

Step 3. —Connect the jumper test cable between the FIL. METERING jack on the Modulator-Oscillator Group OA-745/FRT-15B cabinet (adjacent to Radio Frequency Oscillator 0-317/FRT-15B chassis) —

WARNING

BE POSITIVE PLATE VOLTAGE HAS NOT BEEN APPLIED. FILAMENT OFF TEST JACK J-501 IS AT LETHAL POTENTIAL WHEN PLATE VOLTAGE IS ON.

and each of the four FIL. TEST jacks in the Power Supply Assembly. Operate the SERVICE METER RANGE SELECTOR to FIL. 8V AC MAX and observe readings on FIL-LINE TEST meter at top of Modulator-Oscillator Group cabinet. Readings should be as follows:

JACK	MONITORING	VAC
J-501	+4200V rectifiers	5.0
J-502	+4200V rectifiers	5.0
J-503	- 400V rectifiers	5.0
J-504	+ 960V rectifiers	2.5

Remove test cable when through and close the Power Supply Assembly front door, securely.

(*d*) BIAS CHECK. —Using a 20,000-ohm volt meter measure bias voltages at the terminals indicated:

POWER SUPPLY ASSEMBLY
PP-1198/FRT-15B

TB NO.	Voltage DC	ADJUST
510/10	-400	
510/7	-127 Reg.	R528
518/3	-124	R540
518/4	- 60	R541
518/6	- 24	R542

Note

THE -400 VDC SUPPLY IS NOT ADJUSTABLE.

(3) INITIAL APPLICATION OF SCREEN AND PLATE POWER.

(*a*) GENERAL. —Operate the following controls to the positions indicated.

1. PLATE switch to down (off) position on Radio Frequency Oscillator 0-317/FRT-15B.
2. PLATE ON-OFF switch to OFF position on Radio Frequency Modulator MD-245/FRT-15B.
3. EXC SELECT switch to MO position on Excitation Control unit.
4. ON-OFF switch to OFF position on Power Supply PP-1197/FRT-15B.
5. CARRIER KEY to NORMAL position on both the Audio Frequency Amplifier AM-1150/FRT-15B, and the Exciter IPA unit.

Note

WITH THE SWITCHES IN THESE POSITIONS, THERE IS VERY LITTLE CHANCE OF CAUSING DAMAGE TO RF COMPONENTS DURING THE ORGANIZED VOLTAGE CHECKS AND RF ALIGNMENT PROCEDURES WHICH FOLLOW.

(*b*) POWER SUPPLY PP-1197/FRT-15B.

Step 1.—Check to be certain that the PA PLATE VOLTAGE switch is in the CALIBRATE position.

Step 2.—Operate the ON-OFF switch on the Power Supply PP-1197/FRT-15B to ON. The white POWER ON indicator lamp should light. If it does not, check fuses F-504, F-505, and F-514 in Power Supply Assembly *(figure 7-10.)*.

Step 3.—Operate the -105, +240, +160 selector switch to the -105 position. Check the reading on the meter for a value of 105 (V DC, negative). An improper reading may mean that the rectifier tube V-1003, or the regulator tube V-1004 is defective. Operate the MAIN CIRCUIT BREAKER switch to OFF and remove the screws holding the front panel of the PP-1197/FRT-15B chassis to the cabinet frame. Slide the chassis out from the cabinet just far enough to replace one or both of these tubes *(see figure 7-37.* . Replace chassis and secure it to the frame with the screws and washers provided. Operate the MAIN CIRCUIT BREAKER to ON. Push the FILAMENT START button and hold it in until the blowers have had time to close the air stream interlock switches. Check the meter reading for a value of 105 (V DC, negative).

Step 4.—Operate the -105, +240, +160 selector switch to the +240 position and check the meter reading for a value of 240 (V DC, positive). Adjust the ADJ +240 potentiometer if necessary to effect a 240 reading on the meter.

Step 5.—Operate the selector switch to +160 and check the meter reading for a value of 160 (V DC, positive). Adjust the ADJ +160 potentiometer if necessary to effect a 160 reading on the meter.

(*c*) RADIO FREQUENCY OSCILLATOR 0-137/FRT-15B.—Perform the following checks carefully, keeping alert to any evidence of an irregularity which might provide an indication of possible trouble.

Step 1.—Remove the oscillator chassis from the cabinet and re-connect it to the transmitting set with the bench test cable provided. Wait until the OVEN lamp begins cycling on and off--thus indicating that the oven is up to temperature. Then wait one hour before proceeding.

Step 2.—Operate PLATE ON switch to ON.

Step 3.—Using the station frequency measuring equipment (WWV recommended) check the output frequency of the 100 kc crystal oscillator. Adjust C-103 if necessary.

Step 4.—Determine the frequency that is to be set up for a check, for example: 2,439,224 cps. Operate SET UP--OPERATE switch to SET UP, and insert a headphone in the MONITOR JACK on the front panel.

Step 5.—Set the MASTER OSCILLATOR TUNING dial to the coarse frequency setting--"24" on outer dial, and "39" on inner dial.

Step 6.—Set the INTERPOLATION OSCILLATOR TUNING dial to the difference between the MASTER OSCILLATOR TUNING dial reading and the 5-kc check point immediately below it. In the above case, this would be "42" on the outer dial and "24" on the inner dial.

Note

A FREQUENCY CHECK POINT IS PROVIDED AT EACH 5000-CPS INTERVAL. THE READING ON THE INTERPOLATION OSCILLATOR TUNING DIAL IS ADDED TO THE VALUE OF THE CHECKPOINT IMMEDIATELY BELOW THE READING ON THE MASTER OSCILLATOR TUNING DIAL. IN THIS EXAMPLE, THE CHECKPOINT IMMEDIATELY BELOW THE MASTER OSCILLATOR DIAL SETTING WOULD BE 2,435,000 CPS; THUS THE INTERPOLATION OSCILLATOR TUNING DIAL WOULD BE SET FOR THE DIFFERENCE BETWEEN 2,435,000 CPS AND 2,439,224 CPS, OR 4224 CPS. THE DESIRED OSCILLATOR OUTPUT FREQUENCY WILL BE MOST ACCURATELY OBTAINED IF THE REQUIRED SETTINGS OF THE INTERPOLATION OSCILLATOR TUNING DIAL AND THE MASTER OSCILLATOR TUNING DIAL ARE APPROACHED WHILE ROTATING THESE DIALS IN THEIR CLOCKWISE DIRECTION.

Step 7.—Set the OUTPUT TUNING control as close as possible to the desired frequency. A steady tone should be heard in the headphones.

Step 8.—Readjust the MASTER OSCILLATOR TUNING dial for a low pitched tone (50-100 cps), then readjust the OUTPUT TUNING control for loudness and clarity of tone.

Step 9.—Now, to determine if the AFC motor and associated circuits are working properly, remove the headphone connector plug and place the SET UP-OPERATE switch in its OPERATE position. The AFC motor should be heard going into operation.

(*d*) RADIO FREQUENCY OSCILLATOR 0-324/FRT-15B.—The frequency of the crystals Y-901 through Y-910 (or those only that are to be used) should be checked by the station frequency measuring equipment (primary standard). Adjust trimmer capacitor(s) C-901 through C-910 corresponding to Y-901 through Y-910 for the exact frequency. These capacitors are accessible from the front of the oscillator chassis *(see figures 7-33, 7-34 and 7-35.)* An insulated screw driver should be used.

(*e*) RADIO FREQUENCY MODULATOR MD-245/FRT-15B.—The 200 kc frequency shift oven components may require adjustment - depending upon storage time and ambient atmospheric conditions. Refer to Section 7 paragraph 3.d. for complete details governing the alignment procedure.

(4) INITIAL APPLICATION OF HIGH VOLTAGE POWER.

WARNING

CHECK THE IMMEDIATE AREA AROUND THE TRANSMITTER TO BE CERTAIN IT IS CLEAR OF LOOSE WIRE, TOOLS, AND PERSONNEL. PROVIDE PROPER MEANS FOR DISSIPATION OF THE OUTPUT POWER FROM THE TRANSMITTER. WATCH METER READINGS. CHECK TO BE CERTAIN THAT THE PA PLATE VOLTAGE SWITCH IS ON "CALIBRATE".

(*a*) TUNING.— Set controls to values indicated on the calibration curves, figures 4-5 through 4-10, and tables 4-3 and 4-4 for a low frequency, CW, output. Refer to Section 4 paragraph 4, and then 5 for details of tuning operation. Operate PA PLATE VOLTAGE switch to TUNE. Continue tuning operation check until the PA PLATE VOLTAGE switch can be operated to OPERATE and the transmitter is at full power.

(*b*) HIGH VOLTAGE INTERLOCKS.

Step 1.—Successively open and close the three rear doors and the front center door to determine if the door interlocks are functioning properly. Re-start the high voltage circuit after closing each door. Next, operate BATTLE SHORT switch to ON. BATTLE SHORT indicator lamp should light. Open all three rear doors plus the front center door. The high voltage circuit should remain operative.

Step 2.—Operate MAIN CIRCUIT BREAKER switch to OFF. Remove wire(s) at either of the "NC" terminals on rear of K-510 (accessible from rear of Power Supply Assembly PP-1198/FRT-15B cabinet). Operate MAIN CIRCUIT BREAKER to ON. Push and temporarily hold FILAMENT START button. After BIAS ON lamp lights, try to activate plate circuit power by pushing PLATE START button. Plate power should not come on. Remove line power and re-connect wire(s) to K-510. Operate MAIN CIRCUIT BREAKER to ON; FILAMENT START; and PLATE START.

Step 3.—In LOCAL operation, dial several channels and observe that after each channel is dialed, the PLATE ON indicator lamp extinguishes and it is necessary to re-activate the high voltage circuit by operating the PLATE START button. In REMOTE operation, the high voltage circuit should come on automatically after the autotune system is positioned.

5. PERFORMANCE CHECK.

Note

BEFORE THE TRANSMITTER IS PLACED IN SERVICE, THE FOLLOWING PERFORMANCE CHECK MAY BE MADE.

a. OPERATION OF CONTROLS.—With the transmitter tuned up for full power output on CW,

(1) Dial an operating channel and check that dial mechanisms operate satisfactorily and transmitter comes up on the new channel in properly tuned and loaded condition.

(2) Dial different types of emission and check that output is as desired. A monitor receiver should be used to check type and quality of emission.

b. RF POWER OUTPUT.—With transmitter operating on CW at full power, check the PA CATHODE meter readings *(refer to table 5-1.)* . If transmission line RF ammeters are used, an actual calculation of power output should be made. Repeat the above for full power output on MCW.

c. VOICE MODULATION.—With the transmitter operating at full power on voice modulation, check the percentage modulation on the PERCENT MODULATION meter. When speaking normally, the average value should be about 35 with no peaks above 100. Also check the quality of emission on a monitor receiver.

d. FREQUENCY SHIFT KEYING. — With transmitter operating at full power using frequency shift keying operated by external keying equipment (teletype) listen to the transmission on a monitor receiver. Beat the carrier with the receiver BFO, setting the keying equipment first on "space" and then on "mark", and note that the signal frequency deviates the proper amount.

e. PHASE MODULATION.— With the transmitter operating using frequency shift keying, operate PHASE MODULATION control on the front panel of Radio Frequency Modulator MD-245/FRT-15B to approximately position "5". Note a 200 cycle "wobble" on the signal as heard in the monitor receiver.

f. PHOTOTRANSMISSION.—Connect external phototransmission equipment output or a test keying voltage of about 10 volts at J-806. Adjust Radio Frequency Modulator MD-245/FRT-15B to give ± 1000 cycles deviation for phototransmission. Then with the transmitter operating at full power on phototransmission, note that the frequency, as checked on the monitor receiver, changes approximately 2000 cycles when the photo equipment is keyed (white to black).

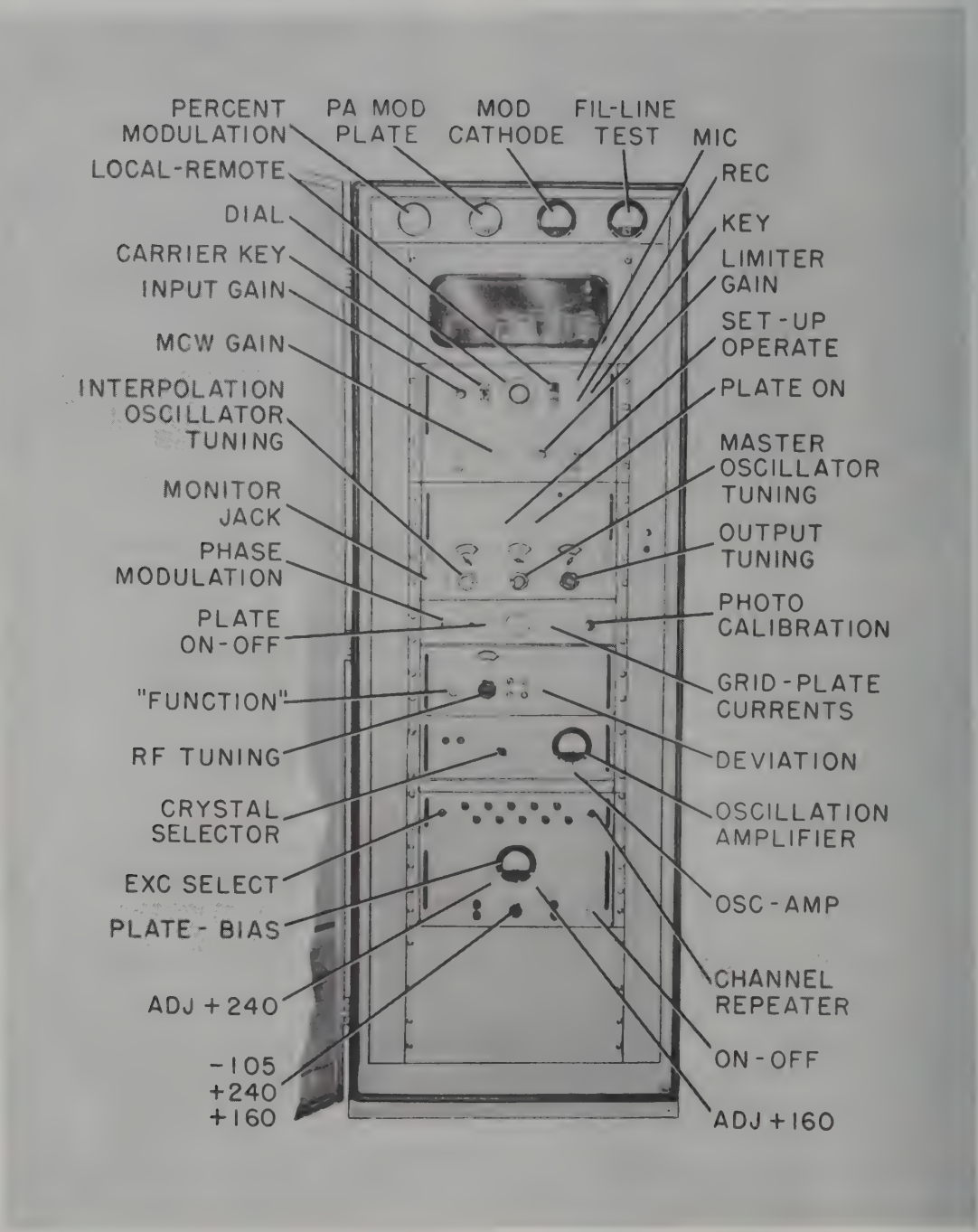


Figure 4-1. Modulator—Oscillator Group OA-745/FRT-15B, Front View

SECTION 4

OPERATION

1. INTRODUCTION.

Radio Transmitting Set AN/FRT-15B is designed for on-off keying of CW or MCW, frequency shift keying (teletype) with phase modulation if desired, phone transmission, or photo (facsimile) transmission in the frequency range from 2 to 30 megacycles. It may be set up to operate automatically on any one of 10 channels with either crystal or master oscillator excitation.

2. AUTOMATIC PROTECTIVE DEVICES.

Overall protection of the equipment against electrical surges, short circuits and overloads is provided by the magnetic type MAIN CIRCUIT BREAKER. An overload relay is provided in the return line of the high voltage circuit. In addition, all medium and low voltage transformers and electric motors are individually protected by fuses.

Loss of bias will cause the bias interlock relay to open and consequently to disable the high voltage circuits. Presence of proper cooling air for the power amplifier and the modulator tubes, coils, and switches is checked by air flow interlocks in the blower ducts. Protection of personnel against high voltage circuits is provided by the use of door interlocks connected in the plate relay control circuit. These interlocks are located on the front door of the Power Supply Assembly PP-1198/FRT-15B, and on all rear doors where ready access to dangerous potentials is possible.

3. CONTROLS AND INDICATORS LOCATION AND FUNCTION.

Location and function of operating controls and indicators are listed in Table 4-1 for ready convenience of operating personnel.

TABLE 4-1. CONTROL AND INDICATOR LOCATION AND FUNCTION

CONTROL DESIGNATION	LOCATION	REFER TO FIG. NO.	TYPE OF COMPONENT	SYMBOL	PURPOSE OF CONTROL
PLATE ON	O-317/FRT-15B	4-1	Switch	S-101	Controls application of +240, +160 V DC from PP-1197/FRT-15B. PLATE lamp lights when ON.
SET UP-OPERATE	O-317/FRT-15B	4-1	Switch	S102	Controls AFC Motor. In OPERATE, the AFC lamp lights.
OUTPUT TUNING	O-317/FRT-15B	4-1	Autotune head	O-109	Tunes output of frequency multipliers V-112, V-113 and plates of spectrum amplifiers V-104, V-105.
INTER-POLATION OSCILLATOR TUNING	O-317/FRT-15B	4-1	Autotune head	O-110	Determines frequency within 5kc range of O-110A dial. Tunes "L" in Z-102 oscillator grid.

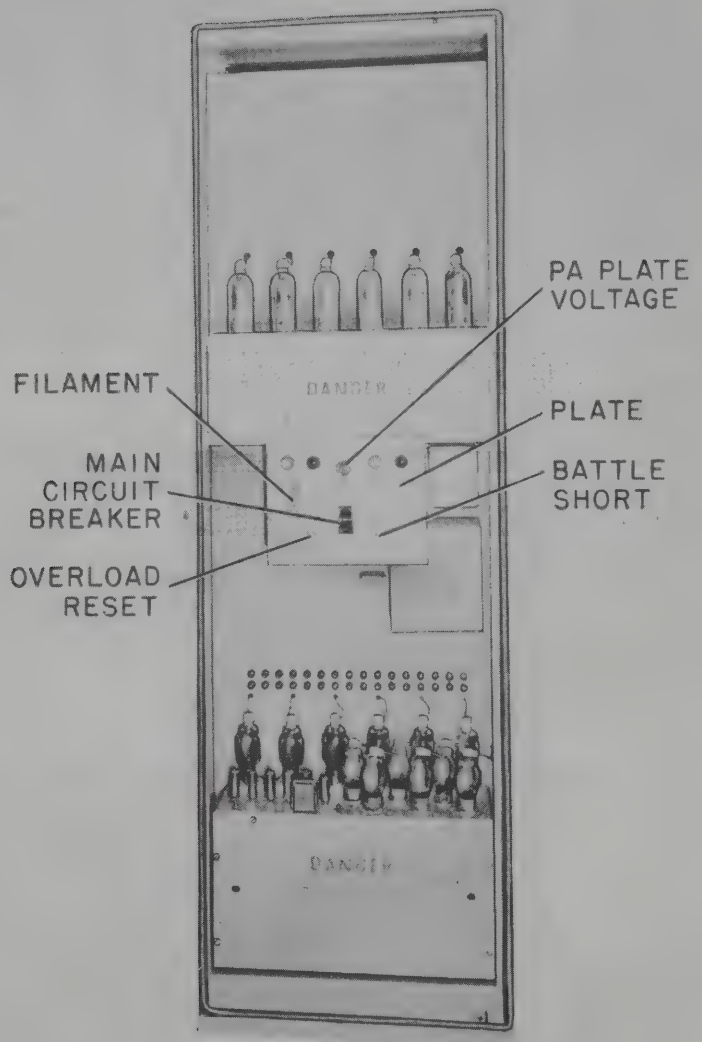


Figure 4-2. Power Supply Assembly PP-1198/FRT-15B, Front View

TABLE 4-1. CONTROL AND INDICATOR LOCATION AND FUNCTION (Cont'd)

CONTROL DESIGNATION	LOCATION	REFER TO FIG. NO.	TYPE OF COMPONENT	SYMBOL	PURPOSE OF CONTROL
MASTER OSCILLATOR TUNING	O-317/FRT-15B	4-1	Autotune head	O-110A	Determines frequency as read on dial. Tunes "L" in Z-101 oscillator grid.
INPUT GAIN	AM-1150/FRT-15B	4-1	Dual pot.	R-324	Input adj to first audio amplifier V-301. Gain increases with nos. on panel engraving (1 to 10).
MCW GAIN	AM-1150/FRT-15B	4-1	Potentiometer	R-325	Regulates output of tone oscillator V-308. Gain increases with nos. on panel engraving (1 to 10).
LIMITER GAIN	AM-1150/FRT-15B	4-1	Dual pot.	R-326	Volt adj applied to plates of rectifier V-305. Limit effect increases with nos. on panel engraving (1 to 10).
SIGNAL KEY	AM-1150/FRT-15B	4-1	Switch	S-301	Serves to close CW circuit when desired for tuning or other adjustments.
LOCAL-REMOTE	AM-1150/FRT-15B	4-1	Switch	S-303	Transfers control of transmitter from local to remote and vice versa.
GAIN	C-1501/FRT-15B	4-4	Potentiometer	R-401	Input adj to first amplifier V-401. VOLUME INDICATOR meter serves as monitor of level.
ON-OFF	C-1501/FRT-15B	4-4	Switch	S-401	Connects input 110V 50-60 cps one phase power to power transformer T-403.
AN/FRT-15B TDH-4	C-1501/FRT-15B	4-4	Switch	S-402	Switches positive or negative voltage to keying circuit.
MAIN CIRCUIT BREAKER	PP-1198/FRT-15B	4-2	Breaker switch	CB-501	Controls application of 220V 50-60 cps three phase power to Radio Transmitting Set, less C-1501/FRT-15B.

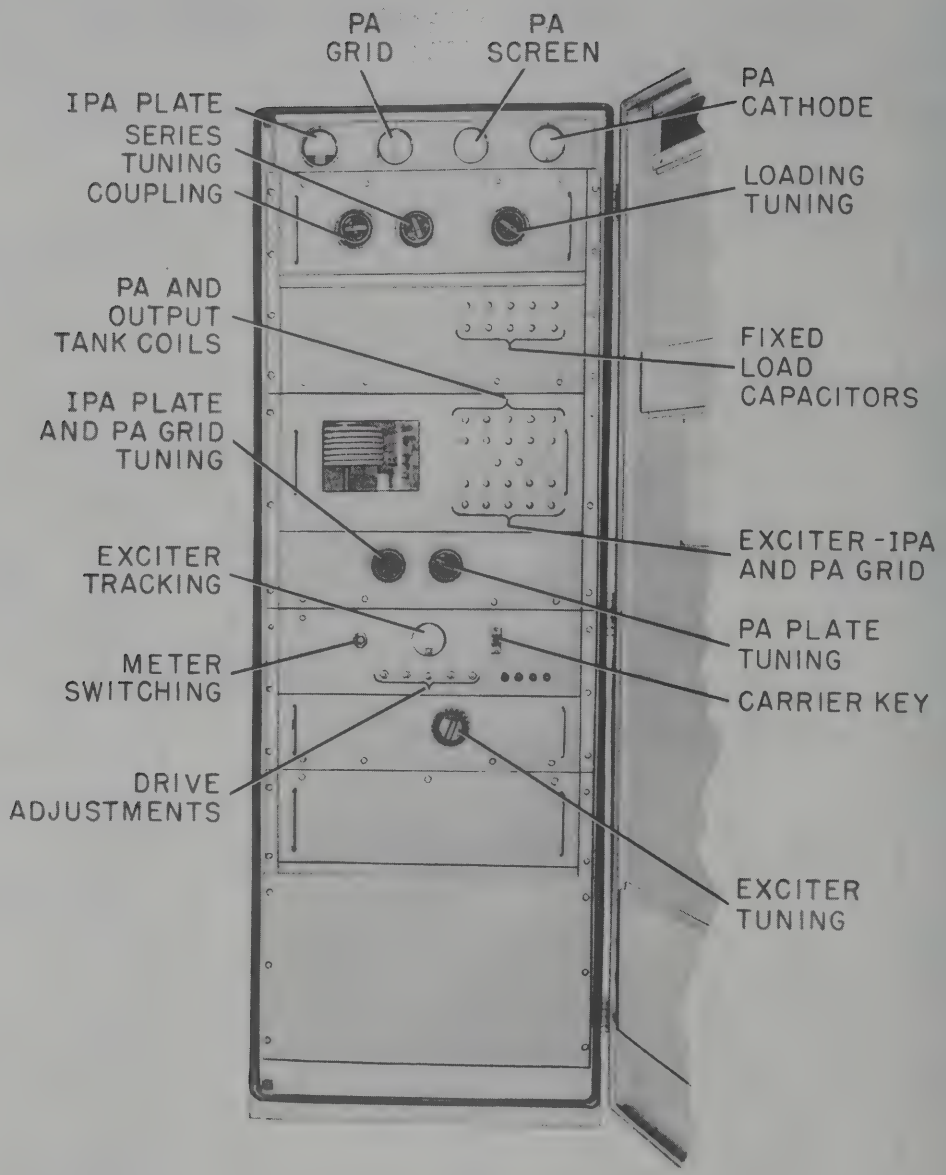


Figure 4-3. Radio Frequency Amplifier AM-1116/FRT-15B, Front View

TABLE 4-1. CONTROL AND INDICATOR LOCATION AND FUNCTION (Cont'd)

CONTROL DESIGNATION	LOCATION	REFER TO FIG. NO.	TYPE OF COMPONENT	SYMBOL	PURPOSE OF CONTROL
PA PLATE VOLTAGE	PP-1198/FRT-15B	4-2	Switch	S-501	Selects full, approximately one-half, or no power as applied to primary of high voltage transformer T-1603.
BATTLE SHORT	PP-1198/FRT-15B	4-2	Switch	S-502	Shunts out door interlocks and PA thermal over load radiation type switch.
FILAMENT	PP-1198/FRT-15B	4-2	Switch	S-504	Controls START-STOP application of line power to filament transformers, blowers, less C-1501/FRT-15B unit.
PLATE	PP-1198/FRT-15B	4-2	Switch	S-503	Controls START-STOP application of power to screen and plate transformers, and to high voltage transformer when S-501 is on TUNE, or OPERATE.
OVERLOAD RESET	PP-1198/FRT-15B	4-2	Switch	S-505	Momentary ON switch grounds (energizing) reset coil in overload relay K-510 (HV circuit).
Channel switches 1 through 10	Excitation Control	4-1	Switch	S-701 through S-710	Excitation selectors for 1 through 10 channels.
EXC. SELECT	Excitation Control	4-1	Switch	S-711	Select type of excitation switched to Exciter IPA.
CHANNEL REPEATER	Excitation Control	4-1	Switch	S-712	Repeats or furnishes channel information to O-317/FRT-15B, O-324/FRT-15B, MD-245/FRT-15B; also serves as channel indicator
RF TUNING	MD-245/FRT-15B	4-1	Autotune head	O-808	Tunes RF stages between balanced modulator plates, V-803, and final amplifier V-804.
PLATE ON-OFF	MD-245/FRT-15B	4-1	Switch	S-801	Applies both +240 and +160 V DC regulated from PP-1197/FRT-15B.
OUTPUT STAGE V-804 GRID CURRENT PLATE CURRENT	MD-245/FRT-15B	4-1	Switch	S-802	Meter Monitoring selector switch.

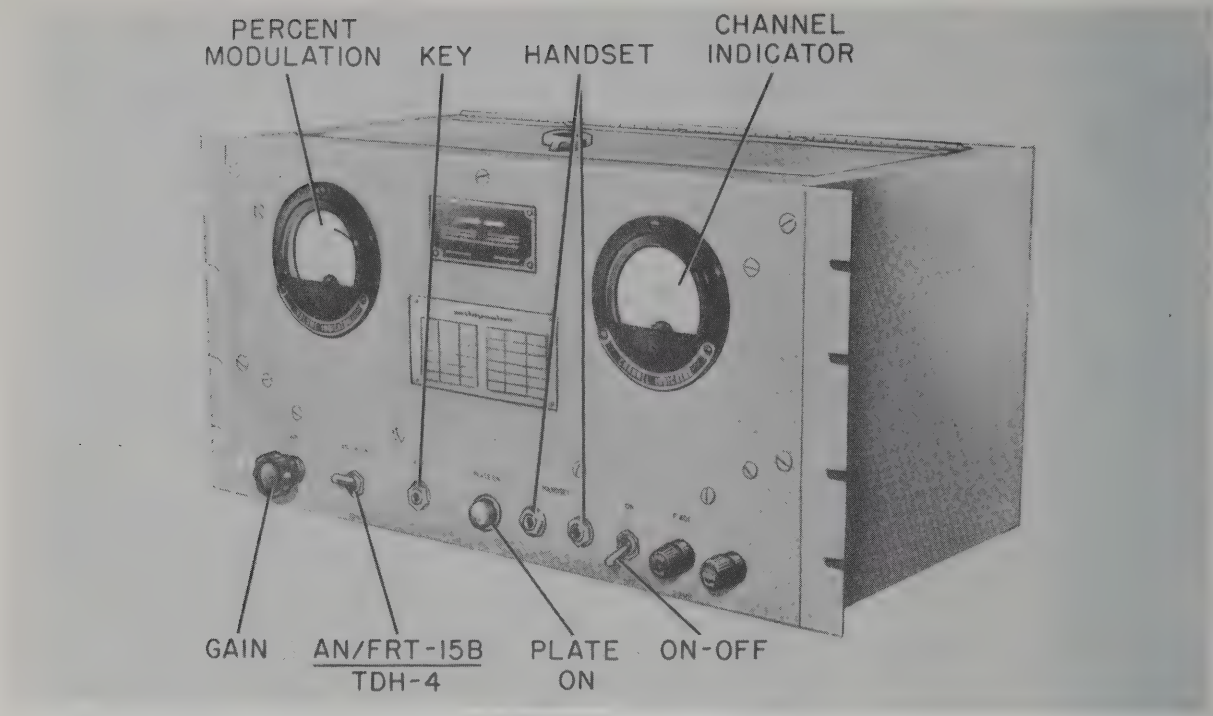


Figure 4-4. Transmitter Control C-1501/FRT-15B, Front Panel Controls

TABLE 4-1. CONTROL AND INDICATOR LOCATION AND FUNCTION (Cont'd)

CONTROL DESIGNATION	LOCATION	REFER TO FIG. NO.	TYPE OF COMPONENT	SYMBOL	PURPOSE OF CONTROL
CARRIER, MARK, SPACE, FSK, PHOTO	MD-245/FRT-15B	4-1	Switch	S-803	Function selector for use in selecting circuits to be tested, and circuits for use in operation.
PHASE MODULATION	MD-245/FRT-15B	4-1	Switch-pot.	S-807	Potentiometer in output circuit of phase modulator. Has OFF position.
PHOTO CALIBRATION	MD-245/FRT-15B	4-1	Potentiometer	R-846	Attenuator input set to produce one volt at reactance tube grid.
DEVIATION	MD-245/FRT-15B	4-1	Potentiometer	R-890	Adjust amount of cps deviation.
OSC-AMP	O-324/FRT-15B	4-1	Switch	S-903	Meter monitor. Selector of cathode current in oscillator V-901, or amplifier V-902 tubes
CRYSTAL SELECTOR	O-324/FRT-15B	4-1	Switch	S-904	Manual switch selector of crystals. Rotate ccw only.

TABLE 4-1. CONTROL AND INDICATOR LOCATION AND FUNCTION (Cont'd)

CONTROL DESIGNATION	LOCATION	REFER TO FIG. NO.	TYPE OF COMPONENT	SYMBOL	PURPOSE OF CONTROL
ADJ +240	PP-1197/FRT-15B	4-1	Potentiometer	R-1017	Adjusts regulated voltage level (for +240 V DC use).
ADJ +160	PP-1197/FRT-15B	4-1	Potentiometer	R-1024	Adjusts regulated voltage level (for ±160 V DC use).
ON-OFF	PP-1197/FRT-15B	4-1	Switch	S-1001	Controls application of 220V AC to power and filament transformers T-1002, T-1001 in this unit.
-105, +240, +160	PP-1197/FRT-15B	4-1	Switch S-1002		Meter monitor selector.
EXCITER TUNING	Exciter IPA	4-3	Autotune head	O-1112	Tunes plate of first, second, and third multipliers V-1101 through V-1103.
2-4 Mc	Exciter IPA	4-3	Potentiometer	R-1114	DRIVE ADJUSTMENT in screen of third multiplier V-1103. Band No. 1.
4-8 Mc	Exciter IPA	4-3	Potentiometer	R1115	DRIVE ADJUSTMENT in screen of third multiplier V-1103. Band No. 2.
8-16 Mc	Exciter IPA	4-3	Potentiometer	R-1116	DRIVE ADJUSTMENT in screen of third multiplier V-1103. Band No. 3.
16-24 Mc	Exciter IPA	4-3	Potentiometer	R-1117	DRIVE ADJUSTMENT in screen of third multiplier V-1103. Band No. 4.
24-30 Mc	Exciter IPA	4-3	Potentiometer	R-1161	DRIVE ADJUSTMENT in screen of third multiplier V-1103. Band No. 5.
METER SWITCHING	Exciter IPA	4-3	Switch	S-1102	Selects one of following for meter monitoring: a. I_G - V-1102 b. I_G - V-1103 c. I_P - V-1103 d. I_G - V-1104 and V-1105

TABLE 4-1. CONTROL AND INDICATOR LOCATION AND FUNCTION (Cont'd)

CONTROL DESIGNATION	LOCATION	REFER TO FIG. NO.	TYPE OF COMPONENT	SYMBOL	PURPOSE OF CONTROL
CARRIER KEY	Exciter IPA	4-1	Switch	S-1103	Same as S-301.
IPA PLATE AND PA GRID TUNING	Power Amplifier	4-3	Autotune head	O-1332	Tunes input circuit to PA tubes by adjusting C-1301.
PA PLATE TUNING	Power Amplifier	4-3	Autotune head	O-1333	Tunes output circuit from PA tubes by adjusting C-1307.
EXCITER IPA AND PA GRID RANGES	Power Amplifier	4-3	Switches	S-1304 through S-1313	Select the band of operation for each of ten channels. Autotune system will position to selected band when channel is dialed.
PA AND OUTPUT TANK COILS	Power Amplifier	4-3	Switches	S-1314 through S-1323	Select the band of operation for each of ten channels. Autotune system will position to selected band when channel is dialed.
LOAD TUNING	Antenna Matching Network	4-3	Autotune head	O-1426	Tunes output line for load condition. Drives C-1406, and also autotune grid seeking switch S-1403.
COUPLING	Antenna Matching Network	4-3	Autotune head	O-1427	Adjusts variable coupling plate between PA plate tank and matching network input
SERIES TUNING	Antenna Matching Network	4-3	Autotune head	O-1427A	Tunes output line through series Capacitor C-1401.
PERCENT MODULATION	C-1501/FRT-15B	4-4	Meter	M-401	Percent modulation indicator.
CHANNEL INDICATOR	C-1501/FRT-15B	4-4	Meter	M-402	Channel follow-up indicator.
GAIN	C-1501/FRT-15B	4-4	Potentiometer	R-401	Audio input adj.
AN/FRT-15B TDH-4	C-1501/FRT-15B	4-4	Switch	S-420	Positive or negative input switch.
KEY	C-1501/FRT-15B	4-4	Jack	J-401	Key input.
HANDSET	C-1501/FRT-15B	4-4	Jacks	J-402 J-403	Phone Rec.
ON-OFF	C-1501/FRT-15B	4-4	Switch	S-401	Line power ON-OFF.

4. FIRST START.

a. PRE-SET CHANNEL SWITCHES.— Any one of four types of excitation can be selected from the internal circuit of the Radio Transmitting Set. The four types are identified on the EXC SELECT switch mounted on the left side of the front panel on the Excitation Control unit (see figure 4-1).

Each type is identified by a code letter (refer to Table 4-2) that is convenient to use when setting up the particular type on each of the ten channels.

To the right of the EXC SELECT switch are ten channel switches. Operate each of the ten channel switches to one of these code letters, depending on which type of excitation is to be employed on each channel. Thus, if channel one is to be excited by the crystal oscillator, the channel "1" switch should be turned to the letter "A". The autotune system will automatically position itself to the channel which will be dialed during the operation procedure (paragraph 8), and the pre-set type of excitation for that particular channel will be automatically switched into the transmitter section.

TABLE 4-2. EXC SELECT SWITCH

CODE LETTER	MODE OF EXCITATION	
A	XTAL OSC	(Crystal oscillator)
B	MO	(master oscillator)
C	XTAL-FSK	(crystal oscillator through frequency shift keyer)
D	MO-FSK	(master oscillator through frequency shift keyer)

Set up the CHANNEL switches on the Power Amplifier chassis in accordance with the values given in Table 4-3.

Set up the FIXED LOADING CAPACITOR and CHANNEL switches on the ANTENNA MATCHING NETWORK chassis in accordance with the values given in Table 4-4.

TABLE 4-3. CHANNEL VS BAND AND FREQUENCY SWITCH SETTINGS

CHANNEL SW. NO.	MULTIPLICATION (X)	EXCITER IPA AND PA GRID RANGES (MC)	PA AND OUTPUT TANK COILS (MC)	FIXED LOADING CAPACITOR ($\mu\mu f$)
1	1	2-3	2 - 2.5	2200 Parallel
2		3-4	2.5 - 2	1200 Parallel
3	2	4-6	3-4	800 Parallel
4		6-8	4-6	400 Series 400 Parallel
5	4	8-12	6-8	400 Parallel
6		12-16	8-12	200 Parallel 400 Series
7	8	16-24	12-14	200 Parallel
8	8	24-30	14-18	400 Series
9	-	-	18-26	0
10	-	-	26-30	-

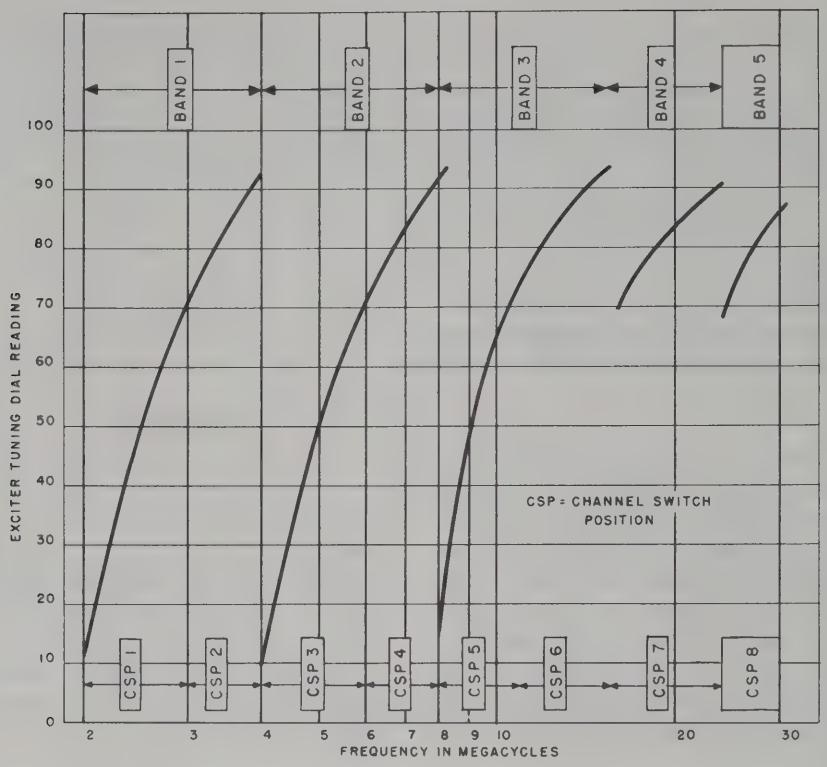


Figure 4-5. Exciter IPA, Calibration Curves

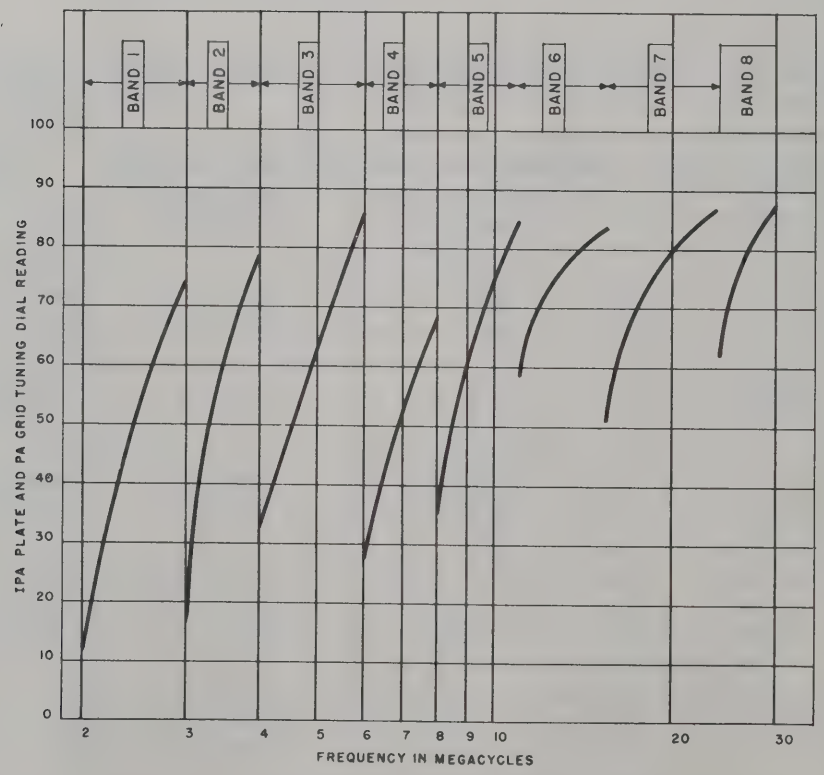


Figure 4-6. IPA Plate and PA Grid Tuning, Calibration Curves

b. TELETYPE AND PHOTO EQUIPMENT.--Connect external teletype and photo equipment as directed in Section 3.

c. CALIBRATION POWER.—Operate the PA PLATE VOLTAGE switch to CALIBRATE. Operate the MAIN CIRCUIT BREAKER, FILAMENT, PLATE switches to ON. This will bring on filament and bias voltages.

d. CHANNEL.—Dial a channel number that is to be tuned.

e. EMISSION.—Dial A-1 for CW as the transmitter should be tuned on CW, only.

f. SETTING UP MASTER OSCILLATOR (O-317/FRT-15B) FREQUENCIES ON CHANNELS *(see figure 4-1.)* .

(1) Operate the PP-1197/FRT-15B power supply ON.

Note

THE O-317/FRT-15B OVEN SHOULD BE STABILIZED AND HOLDING FOR ONE HOUR BEFORE THE FOLLOWING PROCEDURE IS PURSUED.

(2) Operate the O-317/FRT-15B PLATE ON switch to ON.

(3) To set up a particular frequency, loosen the wing nut on each of the three autotune heads and position each dial to the correct value. To decrease any slight chance of backlash in the dial gearing, make the final setting of the dial knob by turning only in a clockwise direction. For example, suppose 2,439,224 cps is desired. First, set the OUTPUT TUNING dial as close as possible to the desired frequency. Second, set the MASTER OSCILLATOR TUNING dial as close as possible to the desired frequency. This is done by setting the outer dial to "2.43" and the inner dial to "9224". Third, the setting for the INTERPOLATION OSCILLATOR must be determined and set, if the last four digits of the desired frequency is over 5000, as in the example. The correct setting will be the difference between the last four digits and 5000. For the example, it would be 9224 minus 5000, or 4224. This is done by setting the outer dial to "4" and the inner dial to "224". If the last four digits were less than 5000, the setting for the INTERPOLATION OSCILLATOR would be the same as the last four digits. Fourth, operate the SET-UP OPERATE switch to the SET-UP position. Fifth, insert the plug of the earphones into the MONITOR JACK. By adjusting the MASTER OSCILLATOR dial slightly, it should be possible to obtain a clear tone on either side of the desired dial setting. Set the MASTER OSCILLATOR so that a clear tone is heard in the earphones. This should be no more than one division of the inner dial, away from the desired frequency. Now adjust the OUTPUT TUNING dial for maximum signal level, in the earphones. Last, adjust the MASTER OSCILLATOR dial for zero beat. Lock the autotune heads by turning the three wing nuts clockwise, being careful not to disturb the settings of the dials. Remove the earphone plug from the MONITOR JACK and operate the SET-UP-OPERATE switch to OPERATE, to complete the tuning of the MASTER OSCILLATOR.

(4) Dial the next channel and repeat the procedure given in the preceding paragraph (3).

g. SETTING UP CRYSTAL OSCILLATOR FREQUENCIES ON CHANNELS *(see figure 4-1.)*.—When installing the separate crystals for each channel that is to be operated, (Section 3, paragraph 4.d.,(3),(d),) the crystals should be inserted in those crystal sockets that correspond to the channels intended for operation. The autotune system will automatically position the crystal selector switch to the contact that corresponds to the channel number dialed.

h. SETTING UP RADIO FREQUENCY MODULATOR MD-245/FRT-15B.

(1) The PLATE STOP push button can be operated because the MD-245/FRT-15B unit has its own power supply - the PP-1197/FRT-15B.

(2) The ON-OFF switch on PP-1197/FRT-15B *(see figure 1-2.)* should be ON. Check the +240, +160 and -105 voltages by operating the selector switch beneath the meter on the front panel of PP-1197/FRT-15B. Adjust the +240 and/or +160, if necessary, by turning the potentiometer(s) located just below the meter to its left and to its right.

(3) Operate the PLATE ON-OFF switch on MD-245/FRT-15B to ON. Allow one hour warm-up.

(4) Operate the function switch on the front panel of MD-245/FRT-15B to CARRIER (test position).

(5) Tune frequency input source 200 kc higher than the desired frequency input to the Exciter IPA unit (prior to any multiplication).

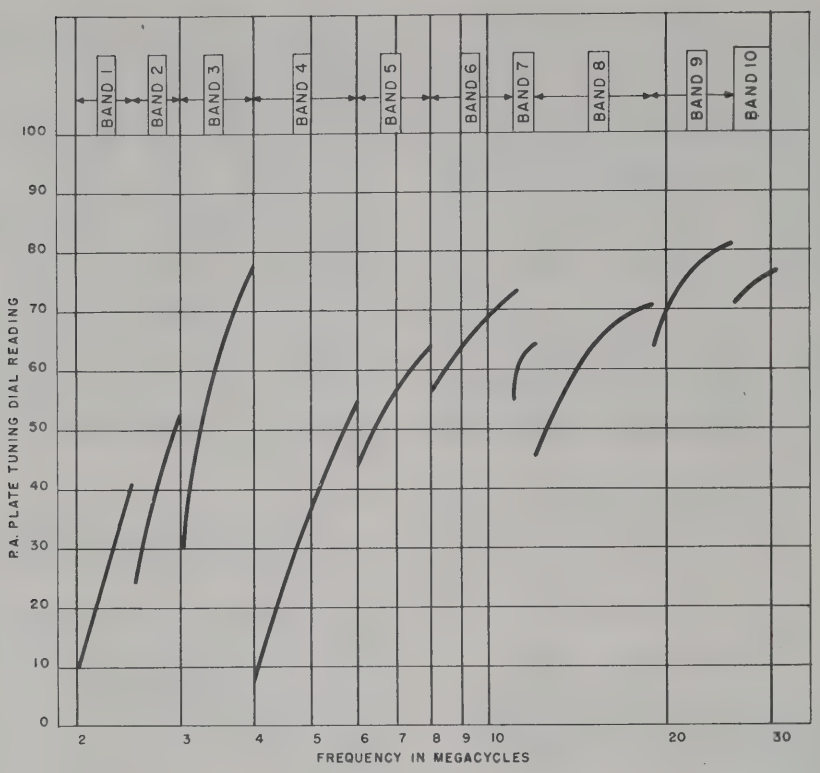


Figure 4-7. PA Plate Tuning, Calibration Curves

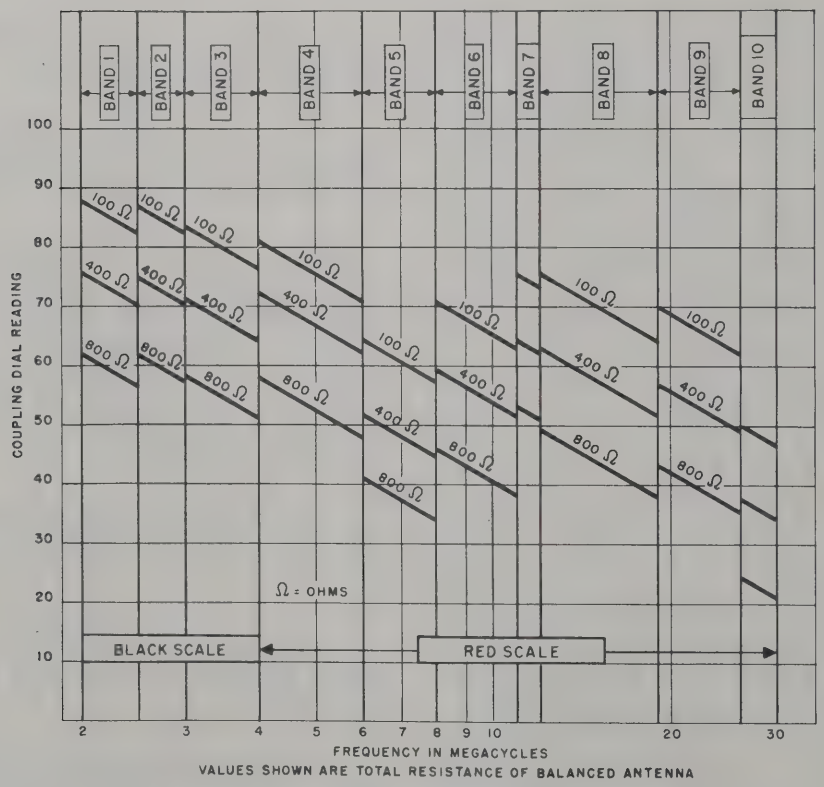


Figure 4-8. Coupling, Calibration Curves

(6) Loosen the autotune head locking wing nut. Operate the meter selector switch to PLATE CURRENT. Adjust the RF TUNING head for peak plate current on the meter. Offset the RF TUNING dial ccw about 30°, then approach the position of peak plate current (as observed on the meter) - stopping the dial in its clockwise travel at the exact spot. Lock the wing nut.

(7) On the MD-245/FRT-15B unit, set the function switch to FSK.

(8) For photo operation, complete the steps (1) through (7), above, then set the function switch to PHOTO.

i. TUNE-UP THE AM-1116/FRT-15B.—To pre-set any one or all of the ten channels, unlock the bar on each autotune head in the Radio Frequency Amplifier AM-1116/FRT-15B bay *(see figure 4-3.)*. Adjust the heads to the proper readings, as determined from the calibration curves in figures 4-5 through 4-10. Note that each head has a corresponding calibration curve, as follows:

AUTOTUNE HEAD	CALIBRATION CURVE FIGURE
EXCITER IPA	4-5
IPA PLATE AND PA GRID TUNING	4-6
IPA PLATE TUNING	4-7
COUPLING	4-8
SERIES TUNING	4-9
LOAD TUNING	4-10

After setting each head to the value indicated in its associated calibration curve, manually tune for peaks. The adjustment should be made by turning each autotune head control knob in a clockwise direction before securing the locking bar. This will insure the minimum amount of backlash in the dial gearing.

Note

BEFORE PROCEEDING, BE CERTAIN THAT THE NECESSARY STEPS IN SELECTING EMISSION, EXCITATION, SETTING OF THE MO, OR CRYSTALS, THE FSK, AND THE PRE-SETTING OF CHANNEL FREQUENCIES HAS BEEN DONE.

(1) GENERAL.— The general procedures outlined in paragraphs (2) through (4) below, are to be repeated for each channel that is to be pre-set. Dial A-1 for CW.

Note

ANY TUNING ADJUSTMENT NOT DESCRIBED HEREIN SHOULD BE DONE ONLY BY AUTHORIZED PERSONNEL. DO NOT POSITION THE PA PLATE VOLTAGE SWITCH TO OPERATE UNTIL THE EQUIPMENT IS TUNED. DAMAGE TO EQUIPMENT MAY RESULT IF THIS RECOMMENDATION IS NOT ADHERED TO. IN THE FOLLOWING INSTRUCTIONS, THE "CARRIER KEY" MUST BE MOMENTARILY OPERATED DURING THE ADJUSTMENT OF EACH TUNING HEAD. ALWAYS TUNE ON CW (A-1).

(2) EXCITER TUNING.

(*a*) The PA PLATE VOLTAGE switch should be set on CALIBRATE.

(*b*) The MAIN CIRCUIT BREAKER, FILAMENT, and PLATE switches should be ON.

(*c*) Unlock the locking bar on the EXCITER TUNING autotune head and rock dial for a peak reading on the I.P.A. PLATE meter. Observe the dial reading very carefully, and also the value of the peak meter reading. Offset the dial about 30° ccw and then approach the dial and meter readings by turning the dial clockwise. When the dial is positioned, carefully secure the locking bar.

(3) IPA PLATE AND PA GRID TUNING.

(*a*) Unlock the I.P.A. PLATE AND PA GRID TUNING autotune head and rock the dial for a peak reading on the PA GRID meter and note that the I.P.A. PLATE meter reading dips toward a minimum reading when the peak value occurs on the PA GRID meter.

(*b*) Secure the dial in the manner described in paragraph (2)(c), above.

CAUTION

DO NOT POSITION "PA PLATE VOLTAGE" SWITCH TO OPERATE UNTIL STEPS GIVEN IN PARAGRAPH (4), BELOW, HAVE BEEN SUCCESSFULLY COMPLETED. DAMAGE TO EQUIPMENT MAY RESULT IF THIS CAUTION IS NOT ADHERED TO.

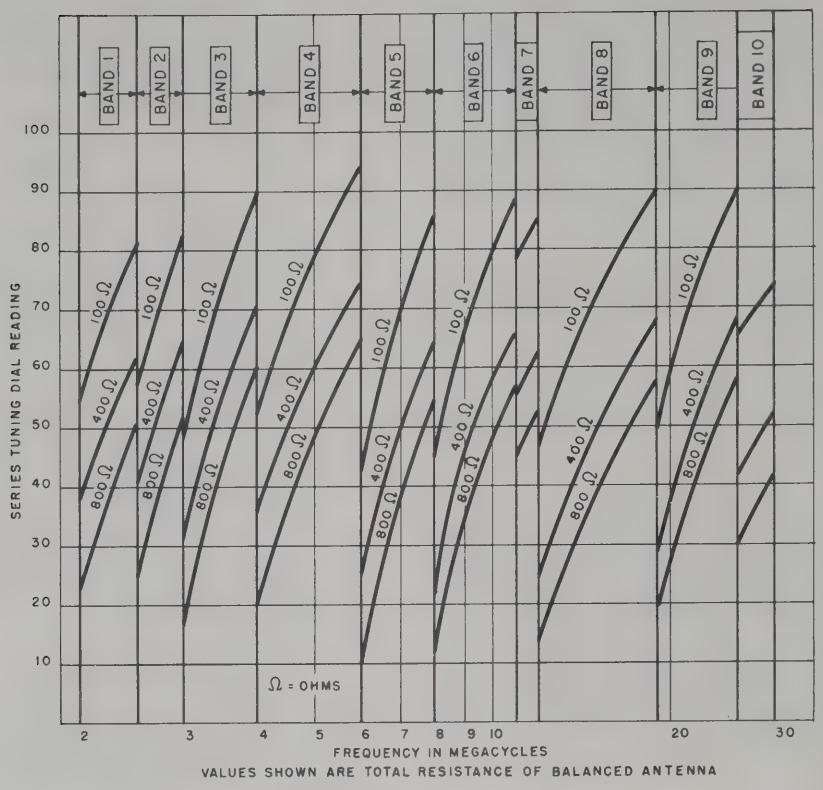


Figure 4-9. Series Tuning, Calibration Curves

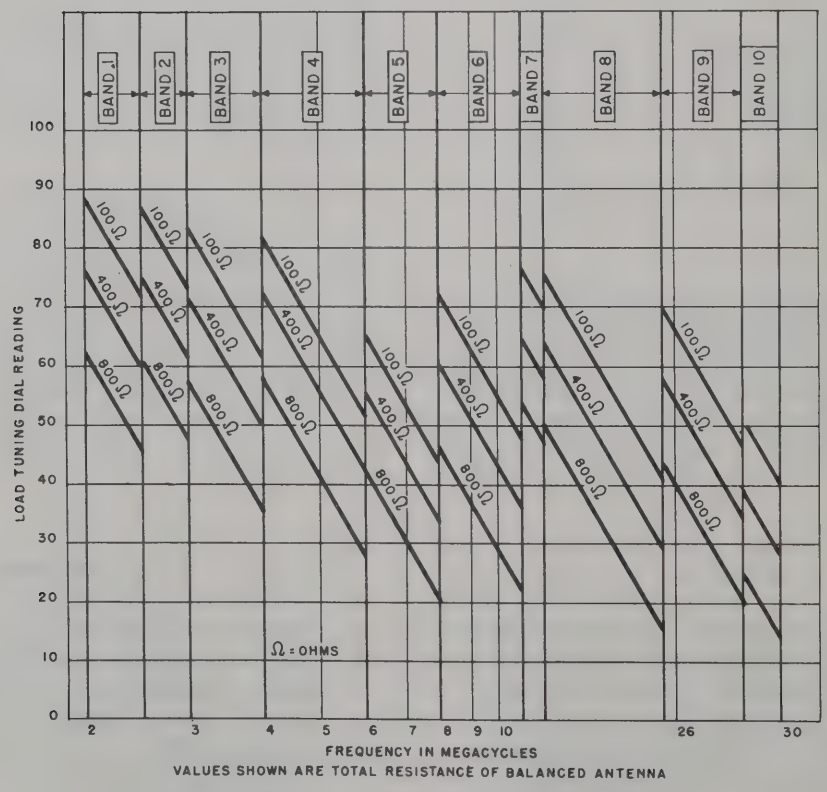


Figure 4-10. Load Tuning, Calibration Curves

(4) PA PLATE TUNING.

(*a*) Operate the PA PLATE VOLTAGE switch to TUNE.

(*b*) Unlock the PA PLATE TUNING autotune head and rock the dial for a minimum reading on the PA CATHODE CURRENT meter.

Note

THIS OPERATION SHOULD BE PERFORMED AS RAPIDLY AS POSSIBLE. POSSIBLE DAMAGE TO THE POWER AMPLIFIER TUBES MAY OCCUR IF THE CIRCUITS ARE UNTUNED FOR RELATIVELY SHORT INTERVALS (30 SECONDS, OR LESS, FOR TUNING OPERATION IS ACCEPTABLE).

(*c*) Peak the PA CATHODE current meter by unlocking and adjusting the SERIES TUNING HEAD.

Note

IF METER PEAKING IS NOT READILY APPARENT, LEAVE THE SERIES TUNING HEAD AT SETTING INDICATED IN FIGURE 4-9 AND ADJUST THE LOAD TUNING HEAD TO PEAK THE METER.

(*d*) Repeat steps (b) and (c), until no further reaction between control elements is noted on the meter.

(*e*) When antenna current meters are available they should be used for final tuning indication purposes. The antenna current should be at a maximum when the PA CATHODE meter reading is at a maximum (or very nearly so).

CAUTION

ONLY AUTHORIZED PERSONNEL SHOULD ATTEMPT TO PERFORM THE NEXT STEP IN THE TUNING PROCEDURE. MIS-TUNING CAN RESULT IN DAMAGE TO EQUIPMENT.

(*f*) After the preceding steps (a) through (*e*) are done, the minimum power output (PA PLATE VOLTAGE switch in OPERATE) should be in agreement with the following:

FREQUENCY (MC)	POWER (KW)
2-12	3
12-26	2-1/2
26-30	2

In the event that the power output is not as desired, check setting of COUPLING control *(figure 4-8.)*, and the FIXED LOADING CAPACITORS CHANNEL settings *(table 4-4.)*. If this control and the switches are positioned according to the data in the figures, try increasing the coupling by slowly adjusting the COUPLING control. Recheck tuning adjustments again as described in paragraphs (b), (c), and (d), above.

j. DIAL DESIRED EMISSION.

CAUTION

BEFORE PROCEEDING BE CERTAIN THAT THE RF STAGES IN THE "RADIO FREQUENCY AMPLIFIER AM-1116/FRT-15B" BAY ARE TUNED. DAMAGE TO THE RF COMPONENTS COULD RESULT IN AN UN-TUNED STAGE.

(1) PHONE (CHANNEL NO.).

(*a*) Operate the LOCAL-REMOTE switch on the Audio Frequency Amplifier AM-1150/FRT-15B to the LOCAL position.

(*b*) Operate the PA PLATE VOLTAGE selector switch on the Power Supply Assembly PP-1198/FRT-15B to the CALIBRATE position.

(*c*) Be certain the BATTLE SHORT switch on the Power Supply Assembly PP-1198/FRT-15B is in the OFF position.

(*d*) The MAIN CIRCUIT BREAKER switch should be ON.

(*e*) If not already done, push and hold the FILAMENT START push button until the air blowers have had sufficient time (one to several seconds) to cause the air flow interlocks to close. The FILAMENTS ON lamp should light.

(*f*) Wait for approximately 30 seconds and observe that the BIAS ON lamp lights. Operate PLATE START push button. The PLATE ON lamp should light.

(*g*) Plug the phone in at the MIC jack on the front panel of the Audio Frequency Amplifier AM-1150/FRT-15B.

(*h*) Turn up LIMITER GAIN control.

(*i*) Turn up INPUT GAIN control.

While speaking into microphone, adjust the INPUT GAIN control until the peaks of modulation, as shown on the PERCENT MODULATION meter just read "70" (approx 100% modulation), but do not exceed this value.

(*j*) Note the reading on the MODULATOR CATHODE meter. The peaks should not exceed 0.6 to 0.8 ampere and the average should be less than 0.4 ampere.

(*k*) Note the reading on the PA CATHODE meter. This reading should be between 1.3 and 1.5 ampere for full power output.

(l) Adjust the LIMITER GAIN control while speaking into the microphone until the needle on the PERCENT MODULATION meter just begins to fall below "70%". The transmitter is now ready for service operation when voice modulated.

(2) MCW (A-2).

(*a*) When using the 1000 cps oscillator for modulating the phone emission, the INPUT GAIN control setting determines the audio amplifier gain. Therefore, this control, which is basically for phone operation, should be set to its normal phone position when using MCW.

(*b*) Dial A-2 and depress CARRIER key. Reading on PERCENT MODULATION meter should be 100 for full power output. Start at "O" on MCW GAIN control and adjust in same manner as for phone (refer par. (1), above). Note the reading on the PA CATHODE meter; this reading should be between 1.3 and 1.5 ampere for full power output check pattern on scope.

(3) FSK OR PHOTO (A-4).

Note

DIAL A-4 DIRECT. NO FURTHER ADJUSTMENTS ARE NECESSARY. HOWEVER, CHECK THE FUNCTION SWITCH ON THE FRONT PANEL OF THE MD-245/FRT-15B TO BE CERTAIN IT IS POSITIONED PROPERLY TO EITHER "FSK" OR "PHOTO" DEPENDING ON SOURCE OF EXCITATION.

5. OPERATION.

a. STAND-BY START.—This equipment is designed to render excellent frequency stability. Temperature controlled ovens are used to house the basic frequency determining elements. For stable operation, the ovens must be warmed for a period of up to approximately three hours prior to going on the air. Of course the equipment will operate as soon as it is energized, but may be slightly off frequency.

(1) Operate the LOCAL-REMOTE switch on the Audio Frequency Amplifier AM-1150/FRT-15B to the LOCAL position.

(2) Operate the PA PLATE VOLTAGE selector switch on the Power Supply Assembly PP-1198/FRT-15B to the CALIBRATE position.

(3) Operate the BATTLE SHORT switch on the Power Supply Assembly PP-1198/FRT-15B to the OFF position.

(4) Operate the MAIN CIRCUIT BREAKER switch to ON.

(5) Push and hold the FILAMENT START push button switch until the air blowers have had sufficient time to cause the air flow switch interlocks to close. Normally, this period of time should not be greater than a few seconds.

(6) Wait for approximately 30 seconds to elapse and observe the BIAS ON green indicator lamp to be certain it is lit.

(7) After approximately one hour but less than two has elapsed, the OVEN indicator lamps on the Radio Frequency Oscillator O-317/FRT-15B, Radio Frequency Modulator MD-245/FRT-15B and the Radio Frequency Oscillator O-324/FRT-15B should begin to cycle on and off. This indicates that the ovens are near to operating temperature. The rate of cycling of the lights is different for each of the ovens although the cycles should be between 15 seconds and one and one half minutes.

(8) Select mode of excitation.

b. LOCAL OPERATION.

(1) Operate the LOCAL-REMOTE switch on Audio Frequency Amplifier AM-1150/FRT-15B to LOCAL.

(2) Complete all steps called for in the preceding paragraph a.

(3) Be certain the PA PLATE VOLTAGE switch is in the CALIBRATE position.

(4) Push the PLATE START button. The red colored PLATE ON indicator lamp should light.

(5) Depress and hold the CARRIER KEY on the EXCITER IPA, or the SIGNAL KEY on the Audio Frequency Amplifier AM-1150/FRT-15B while observing the readings on the PA CATHODE, PA SCREEN, PA GRID, and IPA PLATE Meters. The readings should agree approximately with the values logged in the station calibration chart. As soon as the readings have been observed, release the CARRIER KEY, or the SIGNAL KEY - depending on which key is used.

(6) Turn the PA PLATE VOLTAGE switch to the TUNE position. This will apply approximately one-half of the possible full high voltage to the modulator and power amplifier plate circuits.

(7) Repeat the procedure given in (5), above.

(8) Turn the PA PLATE VOLTAGE switch to the OPERATE position.

(9) Repeat the procedure given in (5). Also compare the readings on the antenna current meters to be certain that the values agree approximately with those that are logged in the station calibration chart.

(10) Select the desired channel of operation by dialing the number ("1" to "10") directly on the dial switch located on the Audio Frequency Amplifier AM-1150/FRT-15B.

(11) Next, select the desired mode of operation by dialing either "A1" for CW, "A2" for MCW, or "A4" for FSK. It is not necessary to dial "A3" because the normal mode of transmission is phone.

Note

IF IT IS NECESSARY TO RE-DIAL THE CHANNEL AND/OR MODE OF OPERATION BECAUSE OF AN ERROR ON THE PART OF THE OPERATOR, IT WILL BE NECESSARY WHEN OPERATING FROM THE LOCAL POSITION ONLY TO MANUALLY RE-START THE HIGH-VOLTAGE RECTIFIER CIRCUIT; PRESS THE "PLATE START" BUTTON. THE RED COLORED "PLATE ON" INDICATOR LAMP SHOULD LIGHT.

(12) After the dialing operation is completed, press the PLATE START button. This step is necessary only when operating in the LOCAL position.

(13) Begin transmission.

c. REMOTE OPERATION.

Note

BEFORE OPERATING THE TRANSMITTER CONTROL C-1501/FRT-15B, BE CERTAIN THAT ALL STEPS OF PROCEDURE AT THE TRANSMITTER PROPER HAVE BEEN EFFECTED. REFER TO PARAGRAPHS a. AND b. PRECEDING. BE CERTAIN THAT THE "PA PLATE VOLTAGE" SWITCH IS IN THE "OPERATE" POSITION SO THAT +4200 VOLTS IS AVAILABLE FOR OPERATION.

(1) Operate the LOCAL-REMOTE switch on the Audio Frequency Amplifier AM-1150/FRT-15B to the REMOTE position.

CAUTION

IF THE "MAIN CIRCUIT BREAKER" IS "ON", THE TRANSMITTER WILL AUTOMATICALLY COME ON WHEN THE "LOCAL-REMOTE" SWITCH IS OPERATED TO "REMOTE". NEVER DIAL A CHANNEL THAT HAS NOT BEEN TUNED, AND NEVER KEY OR OPERATE PUSH-TO-TALK SWITCH BECAUSE THE +4200 VOLT SUPPLY IS ON AND DAMAGE TO RF COMPONENTS IS LIKELY TO RESULT.

(2) On the front panel of the Transmitter Control C-1501/FRT-15B unit that is to be placed in service, operate the AN/FRT-15B - TDH-4 toggle switch to the AN/FRT-15B position.

(3) Turn the GAIN control fully counterclockwise (low).

(4) Operate the ON-OFF toggle switch to ON. The red colored PLATE ON indicator lamp should light.

(5) Allow several minutes for warm up before transmitting. In the meantime, select the desired channel of operation by dialing the number directly on the dial telephone desk set (numbers "1" through "10"). Next, dial the desired mode of transmission; "A1" for CW, "A2" for MCW, and "A4" for FSK. Observe that the desired channel is registered on the CHANNEL INDICATOR meter.

NOTE

IT IS NOT NECESSARY TO DIAL "A3" BECAUSE THE TRANSMITTER IS NORMALLY SET FOR PHONE TRANSMISSION. IF IT IS NECESSARY TO REDIAL A CHANNEL NUMBER AND, OR THE MODE DUE TO AN ERROR WHEN DIALING THE "PLATE START" BUTTON ON THE POWER SUPPLY ASSEMBLY PP-1198/FRT-15B DOES NOT HAVE TO BE PUSHED, AS IT DOES IN LOCAL OPERATION, BECAUSE THE HIGH VOLTAGE CIRCUIT IS AUTOMATICALLY SWITCHED ON AT THE END OF THE REMOTE DIALING SEQUENCE.

(6) For phone transmission, lift the handset from the desk set cradle and press the push-to-talk button. Speak into the microphone and slowly adjust the GAIN control (turn it clockwise) until the needle hovers around the "+2" mark on the right side of the VOLUME INDICATOR scale. If the gain is permitted to attain too high a value, the possibility of distortion in the transmitted signal may be introduced in the system.

(7) For keyed CW or MCW operation, insert the key plug in the KEY jack on the front panel of the Transmitter Control C-1501/FRT-15B and operate the telegraph key or automatic keying equipment.

(8) For photo transmission, the facsimile equipment, which is not supplied as part of the AN/FRT-15B, must be connected to terminal No. 7 of TB-1501, in the Modulator-Oscillator Group OA-745/FRT-15B *(see figure 3-2 then 3-3.)*.

6. STOPPING THE EQUIPMENT.

a. EMERGENCY.—Operate the MAIN CIRCUIT BREAKER switch to OFF. This will effect a complete shut-down.

b. NORMAL.

(1) AUTOMATIC.—Dial A-10.

(2) MANUAL.—Operate the PLATE STOP button. Control, filament, bias and PP-1197/FRT-15B power will be left on.

(3) PP-1197/FRT-15B. — To shut down power output from this unit, operate the ON-OFF switch on its front panel to OFF.

7. TYPICAL DIAL AND METER READINGS.

Reference may be made to Tables 4-4 and 4-5, which are included for the purpose of acquainting personnel with the normally expected control and meter readings corresponding to arbitrarily chosen frequencies.

TABLE 4-4. SETTINGS FOR FIXED LOADING CAPACITORS

FREQUENCY IN MEGACYCLES	ANT 100 OHMS	ANT 400 OHMS	ANT 800 OHMS	ANT 1600 OHMS
2	5	4	4	4
4	9	9	9	9
6	7	9	4	4
8	9	9	9	9
10	9	9	4	4
12	9	9	9	9
14	9	9	6	9
16	9	9	9	9
18	9	9	9	9
20	9	9	9	9
22	9	9	9	9
24	9	9	9	9
26	9	9	9	9
28	9	9	9	9
30	9	9	9	9
CHANNEL SWITCH POSITION				

TABLE 4-5. TYPICAL DIAL READINGS

(CHANNELS 1 TO 5)

CHANNEL NUMBER	1	2	3	4	5
CARRIER FREQ M. C.	2.000000	3.855635	6.000000	8.002000	10.200000
TYPE OF EMISSION	A-4	A-1	A-1	A-4	A-4
EXCITATION SELECTOR	D	B	A	D	C
MO TUNING M. C.	2.200	3.855	---	4.201	---
INTER OSC. TUNING (MO)	0	635	---	1000	---
OUTPUT TUNING MC. (MO)	2.200	3.855	---	4.201	---
CRYSTAL FREQ M. C.	---	---	3.000000	---	2.750000
FSK TUNING	2.000	---	---	4.001	2.550
EXCITER-IPA AND PA GRID RANGES	1	2	3	4	5
PA & OUTPUT TANK COILS	1	3	4	5	6
FIXED LOADING CAPACITOR SELECTOR	4	5	7	9	9
EXCITER TUNING	9	90	70	95	53
IPA PLATE & PA GRID TUNING	14	75	85	70	70
PA PLATE TUNING	19	51	60	70	74
COUPLING	100	100	100	100	100
LOAD TUNING	90	0	84	100	43
SERIES TUNING	56	56	56	60	65

NOTE

ALL READINGS TAKEN WITH 100 OHM LOAD EXCEPT CHANNEL NO. 1 WHICH WAS TAKEN WITH 400 OHM LOAD.

TABLE 4-5. TYPICAL DIAL READINGS (Cont'd)

(CHANNELS 6 TO 10)

CHANNEL NO.	6	7	8	9	10
CARRIER FREQ M. C.	12.000000	16.033000	20.001680	26.000000	30.000000
TYPE OF EMISSION	A-1	A-4	A-1	A-1	A-1
EXCITATION SELECTOR	B	D	B	A	A
MO TUNING M. C.	3.000	2.204	2.500	---	---
INTER OSC. TUNING (MO)	0	4125	210	---	---
OUTPUT TUNING M. C. (MO)	3.000	2.204	2.500	---	---
CRYSTAL FREQ M. C.	---	---	---	3.250000	3.750000
FSK TUNING	---	2.004	---	---	---
EXCITER-IPA AND PA GRID RANGES	6	7	7	8	8
PA & OUTPUT TANK COILS	7	7	9	10	10
FIXED LOADING CAPACITOR SELECTOR	9	9	9	9	9
EXCITER TUNING	70	58	80	75	85
IPA PLATE & PA GRID TUNING	84	48	74	72	85
PA PLATE TUNING	62	77	74	76	88
COUPLING	100	50	100	75	76
LOAD TUNING	34	49	24	20	76
SERIES TUNING	26	68	62	70	14

NOTE

ALL READINGS TAKEN WITH 100 OHM LOAD EXCEPT CHANNEL NO. 1 WHICH WAS TAKEN WITH 400 OHM LOAD.

SECTION 5
OPERATOR'S MAINTENANCE

1. INTRODUCTION.

To maintain the equipment at peak performance, it will be necessary that the operator perform routine checks during each watch when he is responsible for the operation of the equipment. During operation the set may develop minor defects which can be rectified without difficulty by the operator. Correction of these minor troubles at once may prevent the occurrence of major troubles at a later date. The operator should become sufficiently familiar with the technical details of the equipment to service minor defects that may develop when trained technical aid is not available.

2. OPERATOR'S CHECK CHART.

(refer to table 5-1.)

3. EMERGENCY MAINTENANCE.

Note

OPERATORS SHALL NOT PERFORM ANY OF THE FOLLOWING EMERGENCY MAINTENANCE PROCEDURES WITHOUT THE PROPER AUTHORIZATION.

a. RESETTING THE MAIN CIRCUIT BREAKER.--In the event the MAIN CIRCUIT BREAKER has tripped, it can be reset by operating its handle to the ON position.

Note

SUCCESSIVE TRIPPING (THREE OR MORE CONSECUTIVE TIMES) OF THE MAIN CIRCUIT BREAKER IS AN INDICATION OF CIRCUIT TROUBLE IN THE EQUIPMENT. AFTER THE THIRD ATTEMPT AT RESETTING, DISCONTINUE OPERATION OF THE EQUIPMENT UNTIL THE SOURCE OF TROUBLE IS REMEDIED.

b. REPLACEMENT OF FUSES.

CAUTION

NEVER REPLACE A FUSE WITH ONE OF HIGHER RATING UNLESS CONTINUED OPERATION OF THE EQUIPMENT IS MORE IMPORTANT THAN POSSIBLE DAMAGE. IF A FUSE BURNS OUT IMMEDIATELY AFTER REPLACEMENT, DO NOT REPLACE IT A SECOND TIME UNTIL THE CAUSE HAS BEEN CORRECTED.

All fuses are of the small glass-body type. Front panel mounted fuses are held in extractor post mountings. To remove one of these fuses for inspection or replacement, rotate the knurled cap 90° and pull it away from the extractor post mounting. Withdraw the glass-body fuse from the mounting. A spare fuse is mounted in an extractor post adjacent to each operating fuse. In addition, one complete set of operating fuses are supplied in the equipment spares. Refer to Table 5-2 for fuse locations and ratings. Symptoms of fuse failures are listed in Table 5-3.

c. REPLACEMENT OF ELECTRON TUBES.

WARNING

ALLOW TUBES TO COOL BEFORE HANDLING. IF IMMEDIATE REPLACEMENT IS REQUIRED, USE AN ASBESTOS GLOVE AND HANDLE CAREFULLY.

Electron tubes should give many hours of trouble-free operation. Failure of the filament in a tube can usually be detected visually. Other failures may be noted by improper meter readings, or unsatisfactory quality in the monitored signal. When replacing a tube, refer to Table 5-4 for location and type.

TABLE 5-1. OPERATOR'S CHECK CHART

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
TRANSMITTER IN OPERATION EACH WATCH		
Information from previous operator	*a.* Review history in log book. *b.* Receive verbal instructions.	Note changes in operation scheduled for new watch.
Observe all meters	*a.* Record all meter readings. *b.* Compare with previous readings.	Be alert for abnormal or subnormal readings.
Operating frequency	Check output frequency to be certain it is what is desired.	Be certain the transmitter ovens have been warmed up and cycled at their operating temperatures for at least one hour prior to any frequency measurements.
Character of emission	Check quality of CW, MCW key on receiver. If photo-transmission receiver is available, check photo also.	Be certain all operating procedures are followed.
Color of modulator and power amplifier tubes	Visually examine the large 4/1000A tubes by viewing them through the protective glass windows in the Modulator and Power Amplifier front panels. These tubes should render a red-orange color - not a white or deep red.	White color may indicate an overload. Retune the output stages. Tube life is seriously cut short when the tube is not operated properly.
Oven indicator lights	Should light and then go off every half-minute or so, depending on temperature conditions.	If the OVEN light(s) do not illuminate every so often, there is a chance that unstable frequency operation may result due to drifting of the basic frequency determining elements.
TRANSMITTER ON STANDBY EACH WATCH		
Information from previous operator	*a.* Review history in log book. *b.* Receive verbal instructions.	Note if transmitter is to go on the air during new watch.
Transmitter operation	*a.* Place in operation and check all preset channels for proper tuning and loading. *b.* Check meter readings and color of type 4/1000A tubes. *c.* Check output on different types of emission.	Be certain that all meter readings are close to the ones listed in the calibration chart. Do not tamper with the equipment if it does not operate properly. Only personnel trained and authorized to do maintenance work should be permitted to trouble shoot the transmitter.

TABLE 5-2. FUSE LOCATIONS

SYMBOL	LOCATION	PROTECTS	AMPS	VOLTS
F-101	Radio Frequency Oscillator O-317/FRT-15B	Autotune and AFC set-up	3.2	220
F-102	Radio Frequency Oscillator O-317/FRT-15B	100 kc oven and AFC operate	3	250
F-301	Audio Frequency Amplifier AM-1150/FRT-15B	Filament transformer T-305	3	250
F-302	Audio Frequency Amplifier AM-1150/FRT-15B	Filament transformer T-306	5	250
F-401	Transmitter Control C-1501/FRT-15B	Power transformer T-403	3	250
F-501	Power Supply Assembly PP-1198/FRT-15B	Filament transformers T-507, T-508	3	250
F-502	Power Supply Assembly PP-1198/FRT-15B	Filament transformers T-507, T-508	3	250
F-503	Power Supply Assembly PP-1198/FRT-15B	Filament transformer T-502	10	250
F-504	Power Supply Assembly PP-1198/FRT-15B	Filament transformers T-502, T-501	10	250
F-505	Power Supply Assembly PP-1198/FRT-15B	FILAMENT switch S-504	5	250
F-506	Power Supply Assembly PP-1198/FRT-15B	Blower relay K-506	10	250
F-507	Power Supply Assembly PP-1198/FRT-15B	Blower	10	250
F-508	Power Supply Assembly PP-1198/FRT-15B	Blower	10	250
F-509	Power Supply Assembly PP-1198/FRT-15B	Blower	10	250
F-510	Power Supply Assembly PP-1198/FRT-15B	In -48 V supply	10	250
F-511	Power Supply Assembly PP-1198/FRT-15B	Power Transformer T-506	5	250
F-512	Power Supply Assembly PP-1198/FRT-15B	Power Transformer T-506	5	250
F-513	Power Supply Assembly PP-1198/FRT-15B	Power Transformer T-505	10	250
F-514	Power Supply Assembly PP-1198/FRT-15B	Transformers T-501, T-505	10	250
F-515	Power Supply Assembly PP-1198/FRT-15B	-48 V and +115 V controls, transformer T-504	5	250
F-516	Power Supply Assembly PP-1198/FRT-15B	-48 V and +115 V controls, transformer T-504	5	250
F-801	Radio Frequency Modulator MD-245/FRT-15B	Autotune	3.2	250
F-802	Radio Frequency Modulator MD-245/FRT-15B	200 kc oven	3	250
F-901	Radio Frequency Oscillator O-324/FRT-15B	Filament and oven transformer T-901	3	250
F-1001	Power Supply PP-1197/FRT-15B	Filament transformer T-1001 and one side of power transformer T-1002	3	250
F-1002	Power Supply PP-1197/FRT-15B	Power transformer T-1002	3	250
F-1101	Radio Frequency Amplifier AM-1116/FRT-15B	Filament transformer T-1101	3	250
F-1102	Radio Frequency Amplifier AM-1116/FRT-15B	Filament transformer T-1102	3	250
F-1301	Radio Frequency Amplifier AM-1116/FRT-15B	Filament transformer T-1301	5	250

TABLE 5-3. SYMPTOMS OF FUSE FAILURE

Note

NOT ALL CAUSES OF THE SYMPTOMS LISTED HERE ARE DUE TO THE FAILURE OF A FUSE. THIS LISTING IS TO SERVE AS A GUIDE ONLY. IF IN DOUBT ABOUT ANY FUSE, SHUT OFF THE COMPLETE EQUIPMENT BEFORE EXAMINING THE FUSE.

SYMPTOMS	FUSE SYMBOL
TUNING dials on Radio Frequency Oscillator O-317/FRT-15B do not turn when new channel frequency is dialed.	F-101
OVEN HEATER lamp on Radio Frequency Oscillator O-317/FRT-15B does not illuminate at any time.	F-102
PERCENT MODULATION meter not responsive to INPUT GAIN control adjustments on front panel of Audio Frequency Amplifier AM-1150/FRT-15B when operating "A3" (phone). All filaments in AM-1150/FRT-15B chassis not energized.	F-301
Filaments in type 4/1000A modulator tubes, visible through window in front panel of Modulator chassis, are not energized.	F-302
PLATE ON lamp on front panel of Transmitter Control C-1501/FRT-15B does not illuminate. Open access plate on top of cabinet and observe electron tubes visible within. Filaments not seen to glow in any glass enveloped tube.	F-401
Rectifier V-530 through V-533 filaments do not light, FILAMENT ON lamp does not light, and regulators V-518 through V-523 filaments do not light.	F-501 F-502
High voltage rectifier V-539 through V-541 filaments do not light.	F-503
High voltage rectifier V-536 through V-541 filaments do not light.	F-504
Upon starting, the blowers will not operate, FILAMENT ON lamp will not illuminate. During operation with BATTLE SHORT switch ON, the BATTLE SHORT lamp extinguishes.	F-505 F-506
Blower does not operate.	F-507
Blower does not operate.	F-508

TABLE 5-3. SYMPTOMS OF FUSE FAILURE (Cont'd)

SYMPTOMS	FUSE SYMBOL
Blower does not operate.	F-509
No plate voltage, motors B-101, B-801, B-1301, B-1302, B-1401, B-1402 run continuously.	F-510
BIAS ON lamp does not light. PLATE ON lamp will not light when PLATE ON switch button is operated.	F-511 F-512
Power failure in the +960, +460, and +20 volts supply.	F-513
High voltage rectifier V-536 through V-538 filaments do not light.	F-514
Plate voltage shuts off and will not come on.	F-515
Plate voltage shuts off and will not come on.	F-516
TUNING dial on Radio Frequency Modulator MD-245/FRT-15B does not turn when new channel frequency is dialed.	F-801
OVEN ON lamp on Radio Frequency Modulator MD-245/FRT-15B does not illuminate at any time.	F-802
FILAMENT lamp on Radio Frequency Oscillator O-324/FRT-15B does not illuminate, and the OVEN lamp does not light at any time.	F-901
Voltage meter on Power Supply PP-1197/FRT-15B does not register and POWER ON lamp does not light.	F-1001
Voltage meter on Power Supply PP-1197/FRT-15B does not register and POWER ON lamp does not light.	F-1002
Driver V-1104, V-1105 filaments do not light.	F-1101
Filaments in multipliers V-1101 through V-1103, keyers V-1201 through V-1203, and voltage regulator and controller V-1106, V-1107 do not light.	F-1102
Filaments in power amplifier tubes V-1301, V-1302 (type 4/1000A) do not light. These tubes are visible through window in front panel of Power Amplifier chassis.	F-1301

TABLE 5-4. LOCATION AND TYPE OF ELECTRON TUBES

SYMBOL	TYPE	FIGURE	MAJOR UNIT
V-101	5670	7-20	Radio Frequency Oscillator O-317/FRT-15B
V-102	5670	7-20	"
V-103	5670	7-20	"
V-104	5654	7-20	"
V-105	5654	7-20	"
V-107	5654	7-20	"
V-108	5750	7-20	"
V-109	5654	7-20	"
V-110	5750	7-20	"
V-111	5654	7-20	"
V-112	5750	7-20	"
V-113	5654	7-20	"
V-114	5686	7-20	"
V-115	5670	7-20	"
V-116	5670	7-20	"
V-117	5670	7-20	"
V-118	5654	7-20	"
V-119	5686	7-20	"
V-120	5686	7-20	"
V-121	5686	7-20	"
V-122	5686	7-20	"
V-123	5670	7-20	"
V-124	5670	7-20	"
V-125	5726	7-20	"
V-126	5726	7-20	"
V-127	5750	7-20	"
V-128	5749	7-20	"
V-129	5654	7-20	"
V-130*	6SJ7WGT	7-20	"
V-131*	6SJ7WGT	7-20	"
V-301	6SL7WGT	7-16	Audio Frequency Amplifier AM-1150/FRT-15B
V-302	6C8G	7-16	"
V-303	6C8G	7-16	"
V-304	6SJ7WGT	7-16	"
V-305	6X5WGT	7-16	"
V-306	6SN7WGT	7-16	"
V-307	6SN7WGT	7-16	"
V-308	6SN7WGT	7-16	"
V-309	4/1000A	7-14	Modulator
V-310	4/1000A	7-14	"
V-401	6J5	7-54	Transmitter Control C-1501/FRT-15B
V-402	6J5	7-54	"
V-403	5R4WGYA	7-54	"
V-404	6L6GA	7-54	"
V-405	6SH7	7-54	"
V-406	OA3/VR75	7-54	"
V-407	OA3/VR75	7-54	"

* Contained in sealed oscillator cans.

TABLE 5-4. LOCATION AND TYPE OF ELECTRON TUBES (Cont'd)

SYMBOL	TYPE	FIGURE	MAJOR UNIT
V-518	807	7-10	Power Supply Assembly PP-1198/FRT-15B
V-519	807	7-10	"
V-520	807	7-10	"
V-521	807	7-10	"
V-522	807	7-10	"
V-523	807	7-10	"
V-524	6AU6WA	7-10	"
V-525	OA2WA	7-10	"
V-526	OA2WA	7-10	"
V-527	OA2WA	7-10	"
V-528	OA2WA	7-10	"
V-529	OA2WA	7-10	"
V-530	3B28	7-10	"
V-531	3B28	7-10	"
V-532	3B28	7-10	"
V-533	3B28	7-10	"
V-534	3B28	7-10	"
V-535	3B28	7-10	"
V-536	4B32	7-10	"
V-537	4B32	7-10	"
V-538	4B32	7-10	"
V-539	4B32	7-10	"
V-540	4B32	7-10	"
V-541	4B32	7-10	"
V-801	5750	7-27	Radio Frequency Modulator MD-245/FRT-15B
V-802	5750	7-27	"
V-803	5749	7-27	"
V-804	5686	7-27	"
V-805	5726	7-27	"
V-806	5670	7-27	"
V-807	6AU6WA	7-27	"
V-808	6AU6WA	7-27	"
V-809	6AU6WA	7-27	"
V-810	6AU6WA	7-27	"
V-811	5814A	7-27	"
V-812	6J6	7-27	"
V-901	5654	7-33	Radio Frequency Oscillator O-324/FRT-15B
V-902	6AG7	7-33	"
V-903	OA3/VR75	7-33	"
V-904	OA3/VR75	7-33	"
V-1001	5R4WGYA	7-37	Power Supply PP-1197/FRT-15B
V-1002	5R4WGYA	7-37	"
V-1003	6X4W	7-37	"
V-1004	OB2WA	7-37	"
V-1005	6AS7G	7-37	"

TABLE 5-4. LOCATION AND TYPE OF ELECTRON TUBES (Cont'd)

SYMBOL	TYPE	FIGURE	MAJOR UNIT
V-1006	6AS7G	7-37	Power Supply PP-1197/FRT-15B
V-1007	6AS7G	7-37	"
V-1008	6AU6WA	7-37	"
V-1009	6L6GA	7-37	"
V-1010	6AU6WA	7-37	"
R-1028	3-7	7-38	"
R-1029	3-7	7-38	"
R-1030	3-7	7-38	"
R-1031	3-7	7-38	"
V-1101	6V6GT	7-46	Exciter IPA
V-1102	6V6GT	7-46	"
V-1103	807	7-46	"
V-1104	4/65A	7-46	"
V-1105	4/65A	7-46	"
V-1106	6AS7G	7-47	"
V-1107	6SH7	7-47	"
V-1201	5814A	7-47	"
V-1202	5814A	7-47	"
V-1203	5814A	7-47	"
V-1204	OB2WA	7-47	"
V-1301	4/1000A	7-44	Power Amplifier
V-1302	4/1000A	7-44	"

d. REPLACEMENT OF CRYSTALS.

(1) 100 KC STANDARD IN RADIO FREQUENCY OSCILLATOR 0-317/FRT-16B.—This crystal can not be replaced. The oven E-111, should be returned to the manufacturer - who will repair the unit.

(2) VARIOUS CRYSTALS IN RADIO FREQUENCY OSCILLATOR 0-324/FRT-15B.—These crystals (Y-901 through Y-910) are plugged into their respective sockets on the round shaped mounting board *(figure 7-33.)* . Access to these crystals is gained by opening the front panel and backing off on the four captured special round-head screws used to hold the oven in place over the crystals.

Note

THESE CRYSTALS ARE NOT SUPPLIED AS PART OF RADIO TRANSMITTING SET AN/FRT-15B.

(3) 200 KC CRYSTAL IN RADIO FREQUENCY MODULATOR MD-245/FRT-15B. — This crystal should be replaced.

SECTION 6
PREVENTIVE MAINTENANCE

1. INTRODUCTION.

The maintenance of radio equipment does not begin when equipment fails to operate in a normal manner. Maintenance must begin weeks or even months before, when the equipment is first placed in operation. Regular care and inspection, known as preventive maintenance, are just as important as corrective maintenance. Hence, if a regular schedule of preventive maintenance is adhered to, most of the common faults and breakdowns will never occur. Only a few minutes each day are needed to be sure that the equipment is kept entirely free from dirt, dust, sand, excess moisture, vermin, or insects; that all cables and plugs of the equipment are clean and tight-fitting; and that no part of the equipment is being abused or neglected. An outline of the important items to be inspected is listed in the following paragraph.

2. MAINTENANCE SCHEDULE.

Note

"THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67, THE BUREAU OF SHIPS MANUAL, OF THE LATEST ISSUE".

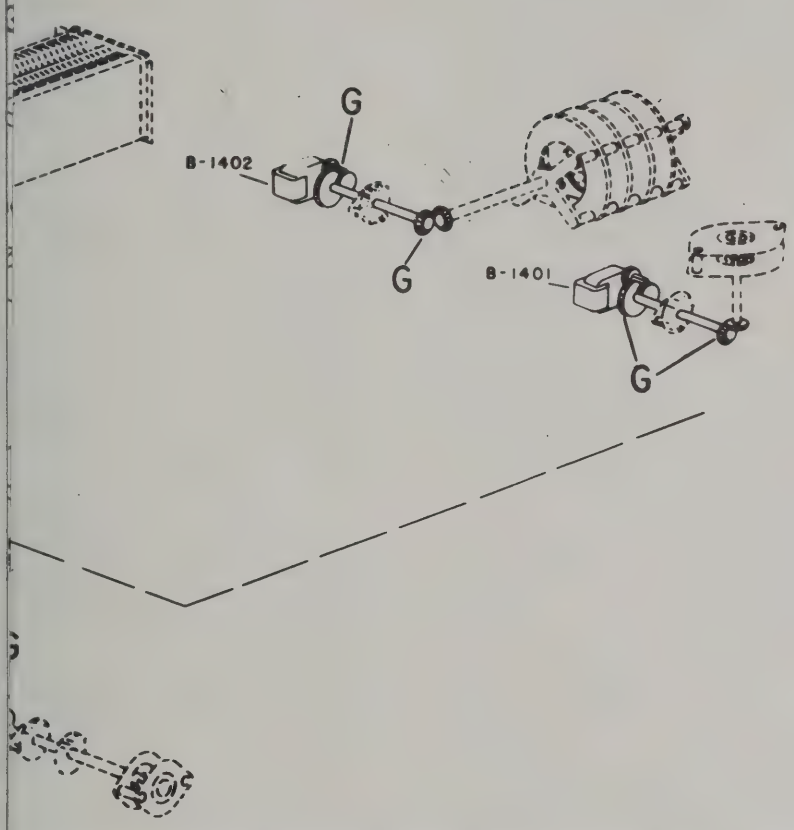
TABLE 6-1. MAINTENANCE SCHEDULE

	WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS & REMEDIES
HOURLY	1. Ovens	Check the oven indicator lamps and see if they cycle.	Verify that oven lamp lights for about two or three minutes, then goes out for about ten or twelve minutes.
	2. Meter readings	Record in appropriate chart and compare for irregularities.	Improper meter readings indicate trouble. Refer to Corrective Maintenance section 7.
	3. Color of tubes and rectifier tube operation	a. Observe tubes for normal color.	a. Abnormal color may be indicative of improperly tuned stage.
		b. No flash-over on rectifiers.	b. To prevent circuit or tube damage, condition must be corrected immediately.
	4. Indicator light on control panel	Observe indicator light.	Unlighted bulb shows particular circuit inoperative. Refer to Corrective Maintenance section 7.

TABLE 6-1. MAINTENANCE SCHEDULE (Cont'd)

	WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS & REMEDIES
DAILY	1. Transformers, chokes, capacitors	Visually and manually inspect all parts in the transmitter for absence of over-heating and damage.	Remedy any signs of breakdown, over-heating, or breakage.
	2. Major connections such as tight caps, wire connections, lock nuts	Feel connections for tightness.	Tighten where necessary.
	3. Zero setting of all transmitter meters	With transmitter completely shut down, all meters should read at far left side of scale.	Erratic readings will result if meters are not zeroed.
	4. Accumulation of dust and dirt	Inspect for absence of dust and dirt deposits in the various compartments.	Take care not to strike tube envelopes with cleaning equipment.
	5. Blower motors	a. Feel motors for normal running temperature. b. Visually inspect rotating parts for absence of wear.	a. Lubrication may be necessary. b. Refer to Lubrication Chart Figure 6-1.
	6. Relay contacts	Visually inspect contacts for pit marks, unevenness, or corrosion.	Use carbon tetrachloride and burnishing tool to remedy.
	7. All door interlocks	Manually operate.	
WEEKLY	1. Rotary contacts and switch contacts	Visually inspect switches and contacts for even operating tension, and absence of pitting.	a. Clean, repair, or replace, as necessary. b. Crocus cloth and carbon tetrachloride may be used for cleaning.
	2. Components enclosed in dust covers	Remove dust cover from particular component and inspect for absence of dust and dirt.	Use care when cleaning to prevent damage to components.
	3. Time delay, and safety devices	Operate each one and observe if proper operation takes place.	If faulty operation is discovered, replace item(s).
	4. Operation of circuit breaker	Manually throw ON and OFF.	Be alert for slippage in operation of switch.

-1116/FRT-15B



ANT		NAVY STANDARD STOCK NUMBER		
	NEAREST COMMERCIAL LUBRICANT	1 LB.	1 PT.	5 GALS.
ing	Esso Nator #2190	—	NI4-0-35000-49	—
ing	Esso Lubricating Grease medium	NI4-G-67000-70	—	—

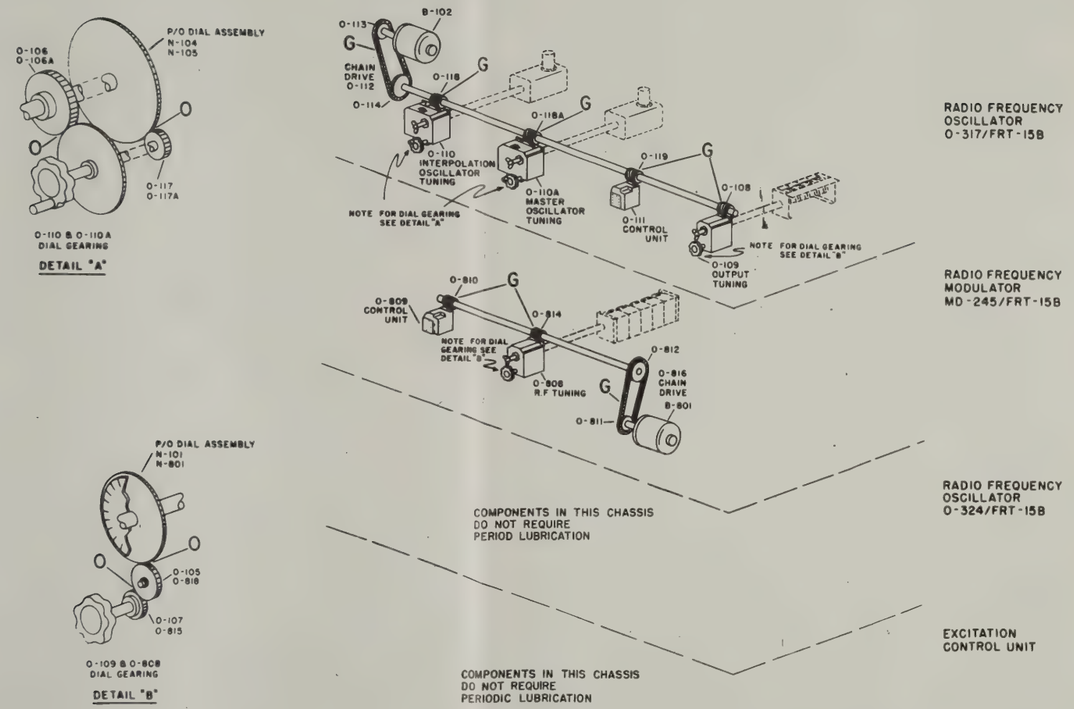
se. Check monthly.
icant to wick. Use oiler. Reverse wick. Check quarterly.
rack and pinion. Check quarterly.
Check quarterly.

Figure 6-1. Lubrication Data, Radio Transmitting Set AN/FRT-15B

TABLE 6-1. MAINTENANCE SCHEDULE (Cont'd)

	WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS & REMEDIES
DAILY	1. Transformers, chokes, capacitors	Visually and manually inspect all parts in the transmitter for absence of over-heating and damage.	Remedy any signs of breakdown, over-heating, or breakage.
	2. Major connections such as tight caps, wire connections, lock nuts	Feel connections for tightness.	Tighten where necessary.
	3. Zero setting of all transmitter meters	With transmitter completely shut down, all meters should read at far left side of scale.	Erratic readings will result if meters are not zeroed.
	4. Accumulation of dust and dirt	Inspect for absence of dust and dirt deposits in the various compartments.	Take care not to strike tube envelopes with cleaning equipment.
	5. Blower motors	a. Feel motors for normal running temperature. b. Visually inspect rotating parts for absence of wear.	a. Lubrication may be necessary. b. Refer to Lubrication Chart Figure 6-1.
	6. Relay contacts	Visually inspect contacts for pit marks, unevenness, or corrosion.	Use carbon tetrachloride and burnishing tool to remedy.
	7. All door interlocks	Manually operate.	
WEEKLY	1. Rotary contacts and switch contacts	Visually inspect switches and contacts for even operating tension, and absence of pitting.	a. Clean, repair, or replace, as necessary. b. Crocus cloth and carbon tetrachloride may be used for cleaning.
	2. Components enclosed in dust covers	Remove dust cover from particular component and inspect for absence of dust and dirt.	Use care when cleaning to prevent damage to components.
	3. Time delay, and safety devices	Operate each one and observe if proper operation takes place.	If faulty operation is discovered, replace item(s).
	4. Operation of circuit breaker	Manually throw ON and OFF.	Be alert for slippage in operation of switch.

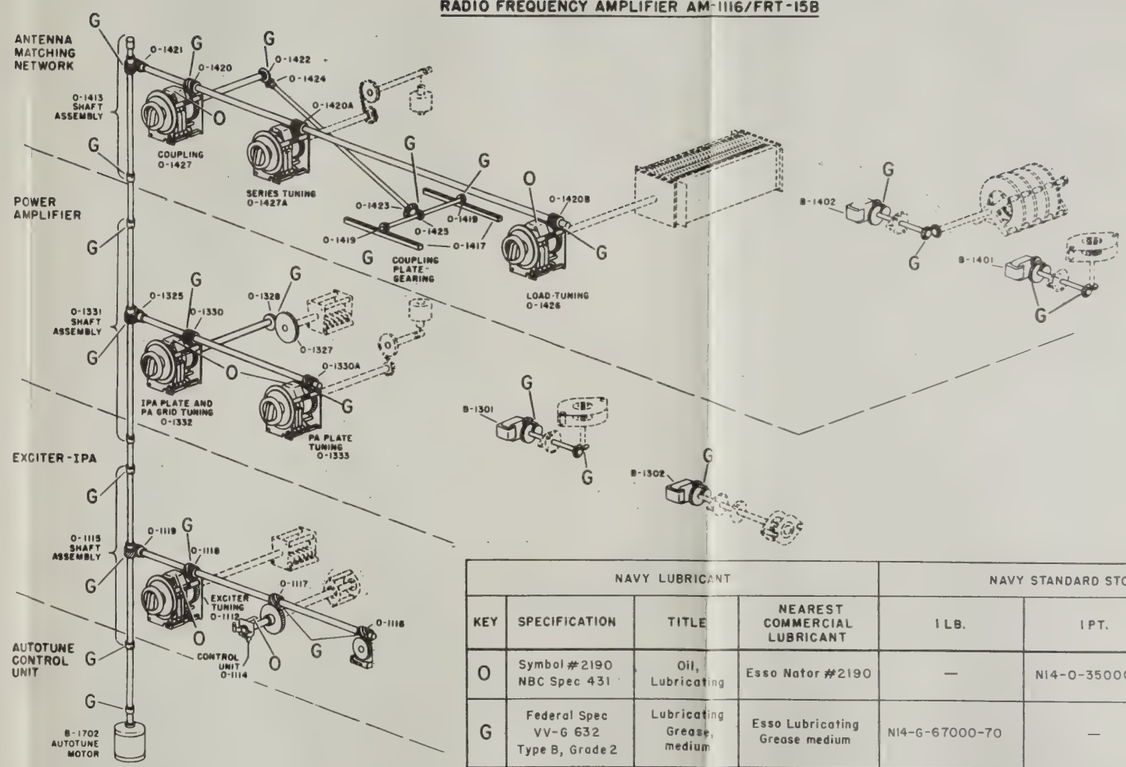
MODULATOR-OSCILLATOR GROUP OA-745/FRT-15B



WARNING

THE AUTOTUNE CLUTCHES MAY SQUEAK, BUT UNDER NO CONDITION SHOULD LUBRICANT BE APPLIED TO THE CLUTCH BAND. THE SQUEAKING IS CAUSED BY FRICTION OF THE BRAKE BAND AGAINST THE BRAKE DRUM, AND DOES NOT DAMAGE THE CLUTCH.

RADIO FREQUENCY AMPLIFIER AM-1116/FRT-15B



NAVY LUBRICANT				NAVY STANDARD STOCK NUMBER		
KEY	SPECIFICATION	TITLE	NEAREST COMMERCIAL LUBRICANT	1 LB.	1 PT.	5 GALS.
O	Symbol #2190 NBC Spec 431	Oil, Lubricating	Esso Nator #2190	—	NI4-O-35000-49	—
G	Federal Spec VV-G 632 Type B, Grade 2	Lubricating Grease, medium	Esso Lubricating Grease medium	NI4-G-67000-70	—	—

INSTRUCTIONS:

1. GEARS. Cover worm gear with grease. Check monthly.
2. HEADS. Apply small amount of lubricant to wick. Use oiler. Reverse wick. Check quarterly.
3. RACK and PINION. Apply grease to rack and pinion. Check quarterly.
4. CHAINS. Grease gearing and chain. Check quarterly.

Figure 6-1. Lubrication Data, Radio Transmitting Set AN/FRT-15B

TABLE 6-1. MAINTENANCE SCHEDULE (Cont'd)

	WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS & REMEDIES
MONTHLY	1. Main tuning shafts	Rotate each to maximum and minimum settings.	Refer to Lubrication Chart Figure 6-1.
	2. Tube sockets and connections	a. Remove plate connections from tubes. b. Examine socket contacts. c. Visually inspect sockets for absence of cracks, breaks. d. Visually examine tube pins for cleanliness.	a. Remove any coating or dullness with crocus cloth. b. Replace cracked or broken sockets.
	3. All nut and screw connections	Be certain there are no signs of corrosion, dullness or poor contacts.	Use crocus or #0000 sand paper for cleaning.
QUARTERLY	1. Bearings	Rotate bearings within their retainers and note any unevenness or binding.	Refer to Lubrication Chart, Figure 6-1.
	2. Tube life and time in use	Review tube operating times.	

3. LUBRICATION.

a. Periodic lubrication of several components having moving parts is required as shown in figure 6-1. Apply grease or oil sparingly. Too much grease may cause components to run hot and may ruin them. Keep grease and oil off brushes, relay contacts and other electrical contact surfaces.

b. In case there is mechanical binding of dials, switches, sliding contacts or rotating parts (NOT ELECTRICAL CONTACTS) a very small amount of Navy spec 14-L-3 Grade 1 grease or commercial "Lubriplate No. 105" may be applied.

FAILURE REPORTS

A FAILURE REPORT must be filled out for the failure of any part of the equipment whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NAVSHIPS 383, which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as T-803, in the case of a transformer, or R-207, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of failure and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from the nearest District Printing and Publication Office.

SECTION 7
CORRECTIVE MAINTENANCE

WARNING

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES (+4200 VOLTS) WHICH ARE DANGEROUS TO LIFE. OBSERVE SAFETY REGULATIONS AT ALL TIMES. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE ON. DO NOT DEPEND ON DOOR INTERLOCK SWITCHES FOR PROTECTION. UNDER NO CIRCUMSTANCES SHOULD INTERLOCKS BE SHORT-CIRCUITED, REMOVED OR TAMPERED WITH, UNLESS SERVICING IS REQUIRED FOR THOSE PARTICULAR PARTS. TO AVOID INJURY ALWAYS GROUND CIRCUITS BEFORE TOUCHING THEM. DO NOT SERVICE ALONE.

1. INTRODUCTION.

In the normal service life of any piece of equipment, faults and breakdowns will develop. In order that the necessary repairs may be carried out in a reasonably short time, a logical testing routine must be followed. The twofold purpose of any corrective maintenance procedure is first, the localization of the faulty circuit or stage and, second, the location of the faulty component or part. The trouble must be determined as quickly and as accurately as possible. The maintenance technician should familiarize himself with the circuitry and the component make-up of the equipment prior to the occurrence of trouble. Reference to schematics, figures 7-58 through 7-69, should be made frequently as an aid to servicing. Also provided as an aid to servicing are a trouble-shooting chart *(table 7-1.)*, a table of resistance measurements *(table 7-3.)* and a table of tube operating voltages and currents *(table 7-4.)*.

When repairs are necessary it is recommended that this servicing be done whenever possible by competent radio technicians, supplied with suitable tools and equipment.

Before proceeding with any extensive repair be reasonably sure that performance of this repair will eliminate the trouble. Do not waste time in needless probing or replacement of parts. When trouble is encountered, be logical.

In all repairs and replacements, every attempt should be made to duplicate the original condition of the equipment. Standard replacement parts, such as supplied in the spare parts accompanying this equipment or taken from stock, should be used. Particular care should be taken to run any replacement wiring in the same position and manner as the original wiring. Only resin-core solder should be employed and only the minimum amount required should be applied. Do not permit excess solder to drop on other components, or remain within the chassis.

In the event of emergency repairs, where it is impossible to make exact replacement of parts, the same care and workmanship must be taken. The temporarily repaired equipment should be conspicuously marked or tagged to indicate the temporary nature of the repair, and restored to its original condition at the first possible opportunity.

2. LOCATION OF FAULTS.

The most frequent cause of trouble in transmitting equipment is tube failure. If a fault occurs in the equipment, each tube should be checked immediately and those found lacking emission replaced with a similar tube from stock. Isolation of the circuit at fault is often helpful in determining the position of the faulty tube.

A check of all fuses should be made immediately if the equipment is inoperative. In case an open fuse is found, it is an indication of an overload in some circuit of the equipment. The overload may be caused by a faulty part, short circuit due to a foreign particle or a bad electrical connection. Occasionally a high voltage arc may be the cause of fuse failure in an associated circuit. If there is reason to believe that an arc has occurred, all capacitor plates and tap switches associated with the circuit should be thoroughly cleaned before placing the equipment back in service. Short circuited components may be readily found by means of an ohmmeter or continuity checker. The d-c resistance of the various circuits may be checked to locate the fault.

TABLE 7-1. TROUBLE SHOOTING CHART

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CHECK OUT
POWER SUPPLY ASSEMBLY		
FIL-LINE TEST meter does not indicate when meter selector switch in 220V AC position and MAIN CIRCUIT BREAKER ON	Breaker may be tripped	Operate breaker OFF and ON.
	Loose connection at T-509, T-510 terminals	Inspect connections for tightness.
Line voltage low or high	Generator output	Adjust connections on T-509, T-510 to meet line voltage different from 220V AC
FILAMENT ON lamp does not light when FILAMENT START button is pushed	Start button not held in	Push and hold START button until blowers are heard in operation plus several seconds.
	Blower(s) not functioning, therefore air interlock switch open	Inspect fuses F-507, F-508, F-509 in blower lines.
		Inspect F-505, F-506 in blower relay lines.
		Check operation of blower relay K-506.
	FILAMENT switch	With 220V AC OFF, connect TB-508 thru TB-516 and TB-509 thru TB-534 apply 220V AC connection of two terminals places power across FILAMENT switch onto blower relay.
BIAS ON lamp does not light after FILAMENT ON lamp illuminates	Not enough time delay permitted (waiting)	Wait 30 to 60 seconds after FILAMENT ON lamp illuminates.
	Fuses	Inspect F-501, F-504 in T.D.R. K-504 circuit. Also check F-511, F-512.
	Time delay relay	Check operation of K-504.
	Bias interlock relay not operating	Check operation; if negative response, measure for approximately -18V DC at TB-508 thru TB-511. If no voltage present, check rectifier circuit comprising V-534, and V-535. Check filament power for these tubes by connecting a line between J-503 on the front panel and the FIL. METERING jack on the Modulator-Oscillator cabinet. Operate the SERVICE METER RANGE SELECTOR switch, above the jack, to FIL. 8V MAX position. The LINE TEST meter snould read 5V, approximately.
PLATE ON lamp does not light after PLATE START switch is operated	Interlock circuits open	Be certain that the BATTLE SHORT switch is OFF and all rear and center front doors are closed.
		Overload relay K-510 locked open. Inspect.
	Plate relay not functioning	Inspect operation of K-508.
	Fuses	Inspect F-510 in -48 V line. F-515, F-516 in primary legs to controls transformer T-504.

TABLE 7-1. TROUBLE SHOOTING CHART (Cont'd)

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CHECK OUT
POWER SUPPLY ASSEMBLY--Continued		
Low voltage output suspected of being sub-normal	Rectifier tube(s)	Check each tube V-530 through V-533 for proper values. Refer to table 7-4.
	Rectifier filament transformer T-507	Check for 2.5V by connecting a line between J-504 on the front panel and the FIL. METERING jack on the Modulator-Oscillator cabinet. Operate the SERVICE METER RANGE SELECTOR switch, above the jack, to FIL. 8V MAX. position.
	+960 V DC adjust	Check setting of R-529.
If there is no low-voltage power available	Rectifier transformer	Check T-505 by inspecting voltages on caps of rectifier tubes V-531 and V-532 *(refer to table 7-4)*.
	Regulator (+960V circuit) filament transformer	Inspect T-508 for tight connection at terminal 9 (with all power off). Visually inspect tubes V-518 through V-523 for filament glow to determine if transformer output is available.
	In +460 V DC circuit, filter L-503 may be open	Continuity check.
RADIO AND AUDIO FREQUENCY CIRCUITS		
PA GRID meter does not register when KEY is closed	Many details require careful analysis. Essentially, the source of excitation may be absent and the trouble would then be either a defective excitation unit, or possible the wrong manipulation of operating controls	Is all power ON? Is the PA PLATE VOLTAGE switch in the TUNE or OPERATE position? Check the position of the knobs on the Excitation Control chassis; they must agree with the channel dialed and the exciter desired. Check the Radio Frequency Oscillators O-317/FRT-15B and O-324/FRT-15B to be certain they are receiving power. If using FSK, check the Radio Frequency Modulator MD-245/FRT-15B to be certain it is functioning properly. Check for excitation voltage pin 5 of V-1101 in the Exciter-I.P.A. unit. A no signal response at pin 5 would indicate that the trouble is in the circuits of the Excitation Control unit, or the exciter intended for use. A signal at pin 5 would indicate trouble in the Exciter-I.P.A. or possibly in the grid circuit of the Power Amplifier. Check continuity of r-f choke L-1305 in meter circuit.
Carrier suspected of remaining on when key is opened	LOCAL-REMOTE switch in wrong position	Operate to proper position.
	Malfunction in keyer circuit V-1201/3 in Exciter-I.P.A. chassis	Check voltages for proper values *(refer to table 7-4)*.

TABLE 7-1. TROUBLE SHOOTING CHART (Cont'd)

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CHECK OUT
	RADIO AND AUDIO FREQUENCY CIRCUITS--Continued	
When using A-3, voice does not cause PA to modulate	Defective microphone	Replace.
	Open r-f choke L-1311	Replace.
	Defective modulation transformer, or possible loose connections	Check connections. Replace T-1501, if necessary.
	REMOTE-LOCAL switch in wrong position	Operate to proper position.
	PA PLATE VOLTAGE switch in wrong position	Operate to proper position.
	Trouble in Audio Frequency Amplifier AM-1150/FRT-15B	Check audio circuits and filament supply.
	Trouble in Modulator circuit	Check filament voltage, connections at cap of tubes V-309, V-310, and then operating voltages *(refer to table 7-4.)*.
Keying transients present on A-2 MCW	Unbalanced elements in V-303	Replace tube.
MCW suspected of not being present when A-2 is dialed	MCW oscillator V-308 inoperative	Check tube V-308.
	MCW relay faulty	Coil for possible open circuit. Contacts cleaned. Timing of MCW relay K-301 for timing sequency relative to horning wafer on autotune relay K-612. Relay K-612 may move before the MCW relay circuit is energized.
	AUTOTUNE DRIVE	
Instead of stopping at the proper setting, the dial continues to rotate in a clockwise direction until the indicator point is opposite the portion of the dial that is not engraved, or the indicator point is above the engraved portion of the dial but the control is not set properly.	Dials were not set properly when the transmitter was originally tuned	Retune the circuit that is out of adjustment by unlocking the stop rings and readjusting the dial. Carefully lock the stop rings.
	The stop rings on the autotune head were not locked tightly enough when tuning adjustments were made	Same as above
	The autotune mechanism is out of synchronization	Synchronize
	Pawl spring weak or broken	Replace autotune head assembly.
	No spring pressure	Loosen screws which retain bar-and-spring assembly. With pliers rotate bar so springs exert force of 12 to 14 ounces on pawls. Tighten screws on spring-bar adjusting arm and spring-bar.

TABLE 7-1. TROUBLE SHOOTING CHART (Cont'd)

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CHECK OUT
AUTOTUNE DRIVE — Continued		
Locking bar cannot properly be aligned with red line on locking-bar stop	Locking-bar stop out of position	Tighten stop-ring lock and note position of locking-bar. Loosen stop-ring lock several revolutions. With small screw driver, rotate locking-bar stop clockwise until tab is 1/4-turn counter-clockwise from position noted above. Replace stop-ring lock and tighten. Screw extending from locking bar should contact tab and rotate locking-bar stop so that locking bar is aligned with red line on locking-bar stop when lock is tight.
	Locking-bar stop is loose	Remove stopping lock. Pry locking-bar stop from knob with small screwdriver. Bend points on edge of disc slightly away from center. Make sure points lie in plane of disc. Be sure that tab is not flat against disc. Tab should extend above disc about 1/16 inch. Replace locking-bar stop and reposition dial.
Autotune will not drive tuning element	Clutch ring worn	Replace autotune head.

Defective tubes causing an overload in power circuits may usually be located by inspection. It will be found that excessive heating or sputtering within the tube(s) is a good indication of fault in the tube circuit.

It is well known that one of the greatest sources of trouble in equipment located in a salt atmosphere is corrosion. Corrosion resulting from salt spray or salt laden atmosphere may cause failure of the equipment for no apparent reason. In general, it will be found that contacts such as the tap switches, tube prongs, cable plug connectors, and telephone type relay contacts are most affected by corrosion. When it is necessary to operate the equipment in localities subject to such corrosive atmospheric conditions, inspection of wiping contacts, cable plugs, and relays should be made more frequently to keep the equipment in good condition.

It is good policy when making checks to refer to the original test data sheets to isolate the source of the difficulty. If the section of the e-equipment in which the fault occurs can be isolated, the trouble may be located with a minimum of effort. Continuity checks and voltage measurements in circuits still operative will be helpful in isolating the trouble. For this purpose an a-c, d-c voltmeter having an internal resistance of not less than 1000 ohms per volt and equipped with a battery for continuity and resistance measurements is necessary. A portable oscilloscope is very useful in running down faults in the radio frequency section of the equipment.

3. ELECTRICAL ADJUSTMENTS.

a. POWER SUPPLIES.

(1) HIGH VOLTAGE.—The PA MOD PLATE meter should read approximately +4200 V DC when operating full power on CW, FSK, or FSK with phase modulation. The voltage should be expected to drop to approximately +3,600 V DC when operating full power on MCW or PHONE. In both cases, the voltage should become approximately one-half when in the TUNE condition. All high voltage readings are with respect to a 220 V AC line input. No single high voltage adjustment is provided. The taps on autotransformers T-509, T-510 should be shifted in the event that the line voltage varies more than approximately p/m 10%.

(2) POWER SUPPLY PP-1197/FRT-15B.—Voltage readings expected and adjustments therefore are discussed in Section 3, paragraph 4. *d*, (3), (b).

(3) BIAS.—Refer to Section 3, paragraph 4. *d*., (2), (d).

b. RADIO FREQUENCY OSCILLATOR 0-324/FRT-15B.

(1) Make certain that the oscillator filament voltage is on. This is indicated by a white FILAMENT pilot lamp on the front panel of this unit. Check the reading of the OSC cathode current on the meter. The reading should be approximately 10 ma. Then check the AMP cathode current - it should be approximately 15 ma. With one crystal (any one) removed, operate the CRYSTAL SELECTOR switch to the empty crystal socket position. Note that the OSC cathode current is higher than 10 ma when there is no oscillation. All ten crystal sockets should be tested first without and then with a crystal inserted therein.

(2) Terminate the output of the crystal oscillator with a 50-ohm resistor and measure the r-f voltage developed with a VTVM. This voltage should be more than 2.0V rms over the crystal range from 2.0 to 4.2 Mc.

c. RADIO FREQUENCY OSCILLATOR 0-317/FRT-15B.

(1) TEST EQUIPMENT REQUIRED.

(a) Signal generator TS-582/U, or equivalent.

(b) Test oscillator with the following crystals; 100 kc, 700 kc, 800 kc, 887.5 kc, 2.2 Mc, 4.0 Mc, 10.125 Mc, and 19.125 Mc. If these crystals are not available, any reliable method of accurately spotting these frequencies may be employed.

(c) VTVM ME-6A/U, or equivalent.

(d) Oscilloscope OS-8/U, or equivalent.

(e) Power Supply PP-1197/FRT-15B.

(f) Bench test cabling, provided with AN/FRT-15B.

(2) EQUIPMENT SET-UP.

(a) Remove the 0-317/FRT-15B chassis from the bay and connect the bench test cabling provided for the purpose.

(b) Operate the following controls:

MAIN CIRCUIT BREAKER	ON
FILAMENT	ON
ON-OFF (PP-1197/FRT-15B)	ON

(3) 800 Kc, SECOND IF ALIGNMENT.

Note

TUBES WHICH MUST BE IN THEIR SOCKETS, AND THOSE WHICH MUST BE REMOVED FROM THEIR SOCKETS, TO PERFORM THE VARIOUS ALIGNMENT PROCEDURES ARE CLEARLY INDICATED IN THE PROCEDURES. THE REMAINING TUBES MAY BE LEFT IN OR OUT, HOWEVER THE OPERATOR DECIDES.

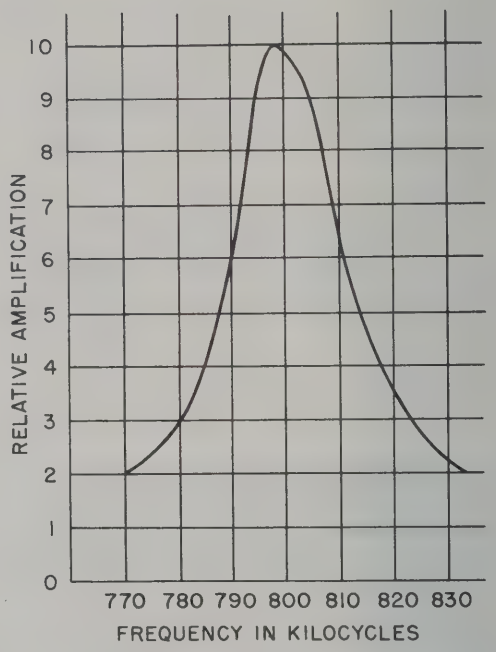


Figure 7-1. Selectivity Curve for 800Kc IF

(a) Remove tubes V-108 and V-109.

(b) Connect signal generator at V-111, pin 1.

(c) Adjust signal generator to 800 kc. Check by zero beating with a test oscillator employing an 800-kc crystal. Output should be one volt unmodulated.

(d) Connect VTVM at T-109, pin 6.

(e) Connect 1000-mmf capacitor across T-109 secondary, pins 4 and 6.

(f) Operate PLATE ON switch to ON position.

(g) Tune T-109 primary for peak reading on VTVM by adjusting top slug of T-109.

(h) Operate PLATE ON switch to OFF position.

(i) Transfer the 1000-mmf capacitor to T-109, pins 1 and 3.

(j) PLATE ON switch to ON.

(k) Tune secondary for peak on VTVM by adjusting bottom slug of T-109.

(l) PLATE ON switch to OFF.

(m) Reduce the signal generator level to 0.1 volt range. Remove the 1000-mmf capacitor.

(n) PLATE ON switch to ON.

(o) Check selectivity by varying the 800-kc signal generator frequency ±30 kc. A typical selectivity curve of this stage is shown in figure 7-1.

(p) PLATE ON switch to OFF.

(q) Connect the signal generator lead to V-110, pin 7. Adjust for 800 kc, output one volt unmodulated.

(r) Connect VTVM leads to T-108, terminal 6.

(s) Repeat steps (d) through (n) now applying procedures to V-110 and T-108.

(4) 875-900 Kc, FIRST IF ALIGNMENT.

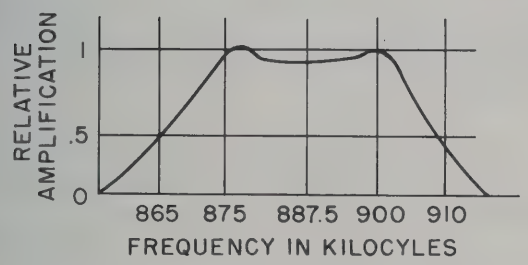


Figure 7-2. Selectivity Curve for 875-900Kc IF

(a) PLATE ON switch to OFF.

(b) Insert tubes V-108 and V-109 in their sockets.

(c) Remove V-110 from its socket.

(d) Connect signal generator lead to V-109, pin 1.

(e) Adjust signal generator to 887.5 kc. Check by zero beating with a test oscillator employing an 887.5 kc crystal. Output should be one volt unmodulated.

(f) Connect a 1000-mmf capacitor to T-107 secondary, pins 4 and 6.

(g) PLATE ON switch to ON.

(h) Tune primary for peak reading on VTVM by adjusting top slug of T-107.

(i) PLATE ON switch to OFF.

(j) Transfer the 1000-mmf capacitor on T-107 to pins 1 and 3.

(k) PLATE ON switch to ON.

(l) Tune secondary for peak reading on VTVM by adjusting bottom slug of T-107.

(m) PLATE ON switch to OFF and remove the 1000-mmf capacitor.

(n) PLATE ON switch to ON. Check selectivity by varying the signal generator frequency from 850 to 920 kc. A typical selectivity curve is shown in figure 7-2.

Note

THE CURVE IS DOUBLE PEAKED. A 10 PERCENT VARIATION BETWEEN PEAKS CAN BE TOLERATED.

(o) PLATE ON switch to OFF.

(p) Move the signal generator lead to V-108 socket, pin 7. Adjust for 887.5 kc, one volt unmodulated output.

(q) Connect VTVM lead to T-106, terminal 6.

(r) Repeat steps (f) through (p) now applying procedures to V-108 and T-106.

(5) REGENERATIVE DIVIDER ALIGNMENT.

(a) PLATE ON switch to OFF.

(b) Remove V-110, from its socket.

(c) Insert V-127 and V-128.

(d) Connect signal generator at V-127 socket, pin 1.

(e) Adjust signal generator to 100 kc. Check by zero beating with a test oscillator employing a 100-kc crystal. Output should be one volt unmodulated.

(f) Connect VTVM at V-128 socket, pin 1.

(g) PLATE ON switch to ON.

(h) Adjust T-111 top slug until peak reading is indicated on VTVM.

(i) PLATE ON switch to OFF.

(j) Connect signal generator at V-128 socket, pin 1.

(k) Adjust signal generator to 700 kc. Check by zero beating with a signal generator employing a 700-kc crystal. Output should be 0.1 volt unmodulated.

(l) Connect VTVM at V-127 socket, pin 7.

(m) PLATE ON switch to ON.

(n) Adjust T-111 bottom slug until peak reading is indicated on VTVM.

(o) PLATE ON switch to OFF.

(p) Connect signal generator at V-111, pin 1.

(q) Adjust signal generator to 800 kc. Check by zero beating with a test oscillator employing an 800-kc crystal.

(r) Connect VTVM lead to T-109, pin 4. A -15 volt d-c reading should be obtained.

(s) Insert V-123, V-124, V-125, V-126, V-129 and V-101.

(t) Connect headphone in MONITOR, J-109.

(u) PLATE ON switch to ON. Check -15 volts dc on VTVM at 800 kc. (Adjust signal generator output if necessary.)

(v) Vary the signal generator tuning from 750 to 850 kc. Note the frequencies at which the audible note from the divider starts as the frequency is varied toward 800 kc.

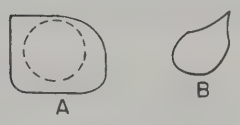
(w) The divider should function between 780 and 820 kc.

(x) If the divider does not start at 820 kc, set the signal generator to 820 kc and adjust T-111 top slug until a smooth audible note is heard.

(y) If the divider does not start at 780 kc, set the signal to 780 kc and adjust T-111 bottom slug until a smooth audible note is obtained.

(z) One or two adjustments between steps (x) and (y) should be sufficient to align the dividers.

(6) 100 Kc PHASE SPLITTER.



BEAT CURVES:
SOLID-0-150 CPS
DASHED-150-1000 CPS
(APPROXIMATELY)

Figure 7-3. Phase Splitter Circuit, Phase Relations

(a) PLATE ON switch to OFF.

(b) Tubes V-111, V-123, V-125, V-126, V-127 and V-128 should be in place.

(c) V-110 should be removed.

(d) Connect oscilloscope vertical plate at V-124, pin 4, horizontal plates at V-123, pin 4.

(e) Connect signal generator lead at V-111, pin 1. Adjust for 800 kc. Check by zero beating with a test oscillator employing an 800 kc crystal. Output 0.1 volt range.

(f) Connect VTVM lead at V-122 socket, pin 2.

(g) PLATE ON switch to ON.

(h) A reading of 15 to 20 volts ac (at approximately 400 cps) should be obtained on the VTVM.

(i) The scope will show the phase relationship between the two audio phases and should conform approximately to those illustrated in figure 7-3. Check the balance of the scope amplifiers to be certain that the vertical and horizontal traces are equal.

Note

IF THE PATTERN OBTAINED IS OTHER THAN "A" *(Figure 7-3.)*, SIMILAR TO "B" FOR EXAMPLE: ADJUSTMENT OF THE UPPER AND LOWER SLUGS OF Z-112 WILL CORRECT THE CONDITION.

(7) MOTOR CONTROL CIRCUIT CHECK.

(a) PLATE ON switch to OFF.

(b) The following tubes should be in the circuit: V-101, V-119, V-120, V-121, V-122 V-123, V-124, V-125, V-126, V-127, V-128 and V-129.

(c) V-110 should be removed.

(d) Connect signal generator lead at V-111 socket, pin 1. Adjust for an 800 kc. Check by zero beating with test oscillator employing 800 kc crystal.

(e) Connect VTVM at T-109, pin 4. A reading of -15 volts dc should be obtained.

(f) Connect oscilloscope as in step (6), (d).

(g) Observe rotation of AFC capacitor C-126.

(h) PLATE ON switch to ON.

(i) Move the signal generator frequency slowly through zero beat as indicated by the scope picture. The motor should rotate at frequencies of less than 1 cps and up to 750 cps.

(8) SPECTRUM AMPLIFIER ALIGNMENT.

(a) Remove tubes V-103 and V-108.

(b) Connect signal generator at V-103 socket, pin 7 through a .01 capacitor. Adjust to 10.1 mc. Output 0.1 volt unmodulated.

(c) Connect VTVM lead at capacitor C-102A.

(d) Adjust OUTPUT TUNING to 2.2.

(e) Center all trimmers.

(f) Adjust Z-106 slug for approximately maximum output.

(g) Transfer VTVM lead to V-108, pin 1.

(h) Adjust Z-107 for maximum output.

(i) Always reduce signal generator output until signal at V-108, pin 1, is less than three volts.

(j) Tune Z-106 slug to maximum. Again adjust Z-107 slug.

(k) Adjust signal generator to 19.1 mc.

(l) Set OUTPUT TUNING control to 4.0 mc.

(m) Tune trimmers C-128A and C-128B for maximum signal.

(n) Return signal generator tuning to 10.1 mc and repeat steps (h) through (m).

Note

OVER COMPENSATING ON STEPS (j) AND (m) AFTER THE FIRST SET-UP, REDUCES THE NUMBER OF TRACKING CYCLES NECESSARY TO OBTAIN THE REQUIRED RESULTS. WHEN PROPERLY ALIGNED THE 2.2 MC AND 4.0 MC OUTPUT POINTS SHOULD COINCIDE WITH THOSE FREQUENCIES.

(9) OSCILLATOR AND POINTS.—Check end points of INTERPOLATION OSCILLATOR TUNING and MASTER OSCILLATOR TUNING for exact settings of 600 and 800 kc and 1 Mc and 1.5 Mc, respectively. The MASTER OSCILLATOR TUNING end points should exactly coincide when the switch arm actuated by the AFC motor cam is at the high point of its travel.

(10) MULTIPLIER TRACKING.

(a) Remove V-108 from socket.

(b) Set MASTER OSCILLATOR TUNING dial to 2.2 Mc.

(c) Set OUTPUT TUNING to 2.2 Mc.

(d) Connect VTVM at V-112, capacitor C-120D.

(e) Tune Z-104 slug for maximum output.

(f) Transfer VTVM to V-108, pin 1.

(g) Tune Z-105 slug for maximum output.

(h) Retouch Z-104 slug for maximum output.

(i) Set MASTER OSCILLATOR TUNING dial on 4.0 Mc.

(j) Adjust OUTPUT TUNING to 4.0 Mc.

(k) Adjust trimmers C-128C and C-128D for maximum output.

(l) Return MASTER OSCILLATOR TUNING dial to 2.2 Mc and repeat steps (g) through (k).

Note

OVER COMPENSATING ON STEPS (g) (h), AND (k) AFTER THE FIRST SET-UP, WILL REDUCE THE NUMBER OF CYCLES NECESSARY FOR PROPER TRACKING.

(11) 100-kc CRYSTAL OSCILLATOR ALIGNMENT.—Adjust the crystal oscillator to exactly 100 kc using C-103 and an external means of frequency measurement.

d. RADIO FREQUENCY MODULATOR MD-245/FRT-15B.—Adjust oven components first (paragraphs (1) through (35), below). The adjustments can be grouped under the following three major steps:

Step 1.—Isolate multiplication factor circuits from 200 kc oscillator portion. Set oscillator for 200 kc, ± 1 cps.

Step 2.—Balance the reactance tubes under condition of no grid signal and 200 kc oscillator not shifting.

Step 3.—Adjust reactance shift circuit sensitivity for ± 1 kc shift with ± 0.5 volt applied to grid of V-809.

Step 4.—Adjust multiplication factor circuit for proportionate deviation.

(1) OVEN ADJUSTMENTS.—Operate SHIFT MULTIPLY SWITCH *(see figure 7-5.)* assembly and set all trimmers to center.

(2) Remove oven E-895 *(figure 7-27.)* assembly and set all trimmers to center.

(3) Set COARSE TUNING C-861 to maximum capacity.

(4) Set the AC and the DC BALANCE controls R-857, R-899 to their approximate center.

(5) Operate the function switch S-803 on the front panel of MD-245/FRT-15B to CARRIER.

(6) Operate S-805 to ON position. This switch is located alongside the test socket E-868 *(figure 7-27.)*.

(7) Apply plate power from PP-1197/FRT-15B. Allow two hours for warm up.

(8) Place r-f probe at the mixing point between L-815, C-835, and T-803; adjust slug at the top of T-803 to max ccw position (slug all the way out). Gradually turn slug in the cw position. Watch meter and set slug on the second r-f peak. Meter should read approximately 3 volts.

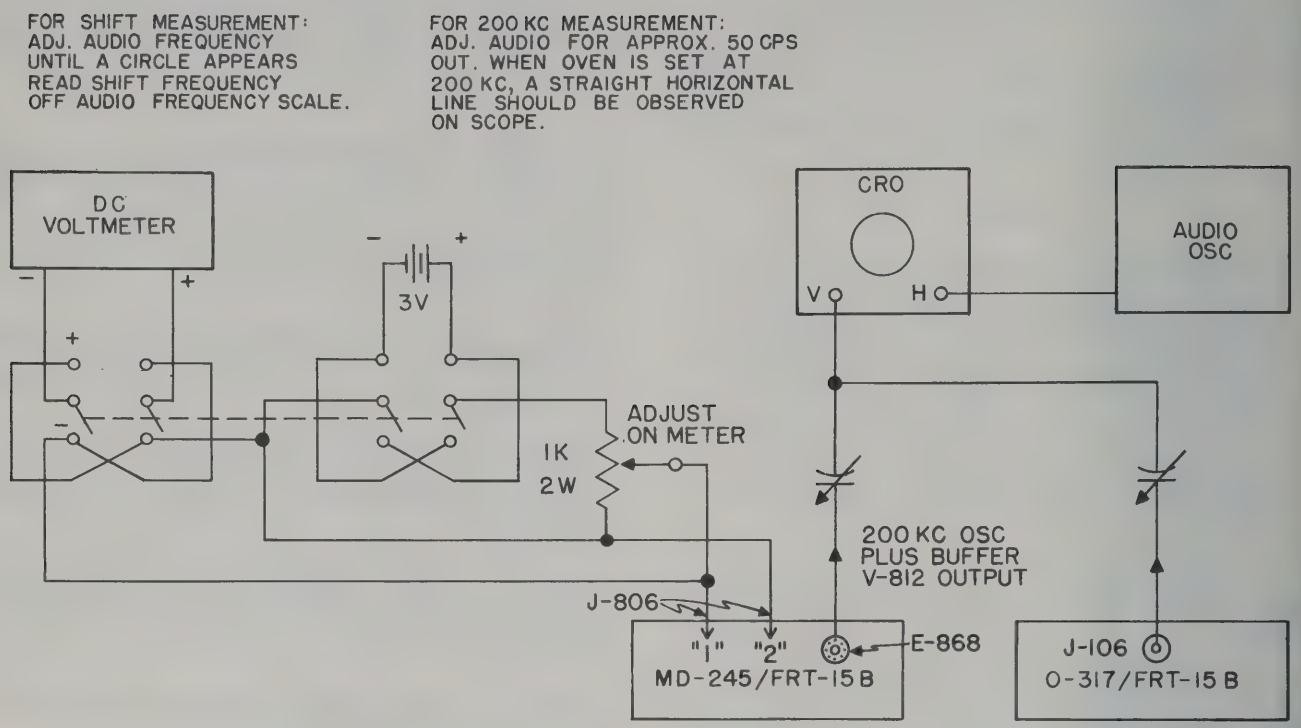


Figure 7-4. Interrelationship of Alignment Test Equipment

(9) Set up test equipment as indicated in figure 7-4. Adjust COARSE TUNING C-861 *(see figure 7-5.)* for 200 kc output. Check for 200 kc signal at test socket E-868, pin 8.

(10) Operate SHIFT MULTIPLY SWITCH to X-1.

(11) Set RESONANCE ADJUST for 200 kc.

(12) Operate S-805 to OFF.

(13) Set AC BALANCE for 200 kc.

(14) Re-check steps (12, with S-805 ON), (13), and (14).

(15) Set PHOTO BALANCE R-850 for minimum resistance (max ccw), PHOTO CALIBRATION (max cw), DEVIATION (max cw), and the function switch to PHOTO.

(16) Apply + 0.5 volt potential to pin 1 of J-806. Check for -1 kc shift (with respect to 200 kc) at pin 8 of test socket E-868. Record amount of shift, for example 960 cps below 200 kc.

(17) Apply -0.5 volt potential to pin 1 of J-806. Check for plus (+) kc shift with respect to 200 kc at pin 8 of test socket E-868. Record amount of shift, for example 990 cps above 200 kc.

(18) Take the observed shifts of steps (16) and (17), and calculate the difference value - for example:

In step (16) . . . . -960 cps shift
In step (17) . . . . +990 cps shift
30 cps difference

Then take one-third of this calculated value

1/3 of 30 = 10 cps

and subtract it from +990 cps shift

+990
- 10
+980 cps

to obtain the value that the SHIFT BALANCE L-815 control should be adjusted for, at pin 8 of E-868 with positive potential applied to pin 1 of J-806.

(19) Re-check steps (16) through (18) until the observed plus and minus shifts are balanced to within one percent about 200 kc.

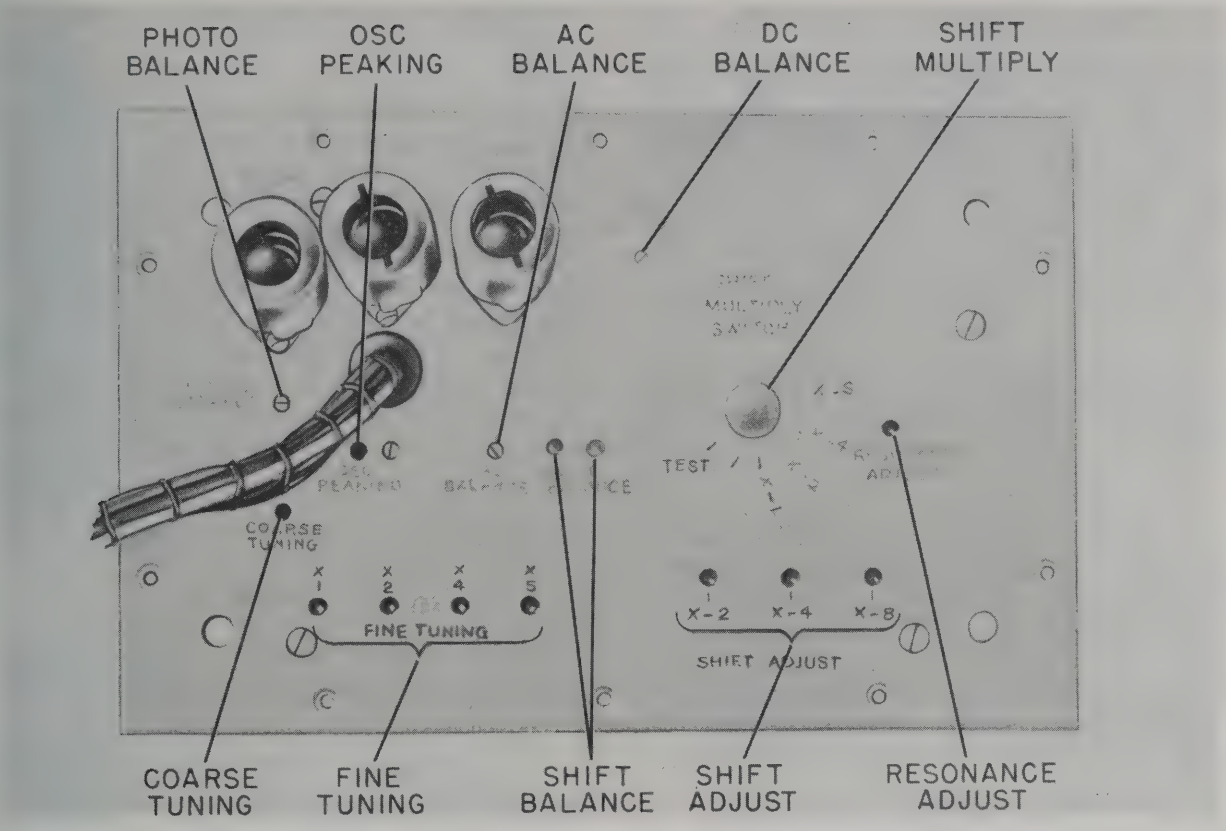


Figure 7-5. Radio Frequency Modulator MD-245/FRT-15B, Top View of Oven

(20) Check PHOTO LINEARITY by applying positive 0.5 volt to pin 1 of J-806. Check to be certain that PHOTO CALIBRATION and DEVIATION controls are in maximum cw position. Turn PHOTO BALANCE control in the cw position until zero shift is observed. Vary input voltage from + 0.5 volt to + 1 volt. Observed shift should be -1000 cps ± 5%. Vary input voltage to + 0.25 volt and + 0.75 volt. Observed shift should be +500 and - 500 cps ± 5%. Should the observed shift be out of tolerance, slight adjustment of the SHIFT BALANCE control with + (positive) input and the oscillator peaking coil Z-803 with negative input will bring the modulator into adjustment.

Note

WHENEVER ANY ADJUSTMENT IS MADE TO Z-803 OR L-815, CHECK AND READJUST CENTER FREQUENCY TO 200 KC, BY CLOSING S-805 AND READJUSTING COARSE TUNING CAPACITOR C-861 WITH FUNCTION SWITCH IN CARRIER POSITION.

(21) Repeat steps (9) through (14).

(22) MULTIPLICATION CIRCUITS – Check to be certain that SHIFT MULTIPLY SWITCH is set at X-1 position. Return PHOTO BALANCE adjustment to max ccw position. Place FUNCTION SWITCH to PHOTO position. Apply positive 0.5 volt to pin 1 of J-806. Shift should be minus (–) 1000 cps above 200 kc. (With minus (-) 0.5volt input, shift should be plus (+) 1000 cps ± 5%).

(23) Operate the SHIFT MULTIPLY SWITCH to X-2 and the calibrate switch S-805 to ON.

(24) Adjust FINE TUNING control X-2 (C-846) for 200 kc, measured at pin 8 of E-868.

(25) Operate S-805 to off. Ground input circuit by placing function switch in the carrier position.

(26) Adjust the DC BALANCE control R-899 for 200 kc, measured at pin 8 of E-868.

(27) Recheck steps (23) through (26).

(28) Place function switch in PHOTO position. Apply + 0.5 volt to pin 1 of J-806. Set SHIFT ADJUST X2 for -500 cps shift, measured at pin 8 of E-868. (With -0.5 volt input, shift should be + 500 cps ± 5%.)

(29) Recheck steps (23) through (28).

(30) Operation SHIFT MULTIPLY SWITCH to X4, and CALIBRATE switch S-805 to ON. With function switch in the CARRIER position, set FINE TUNING X4 for 200kc output. With S-805 OFF, place function switch in PHOTO position and apply +0.5 volt to input of J-806. Set SHIFT ADJUST X4 for -250 cps shift. (With minus (-) 0.5 volt input, shift should be plus (+) 250 cps.)

(31) Using (30) as a guide, set X8 SHIFT ADJUST for -125 cps shift with +0.5 volt input. (With minus (-) 0.5 volt input, shift should be plus (+) 125 cps.)

(32) To check FSK space condition, operate SHIFT MULTIPLY SWITCH to X1, the function switch to SPACE and adjust R-839 for a +500 cps shift, measured at pin 8 of E-868.

(33) After setting space condition, operate function switch to MARK and adjust R-858 for -500 cps.

Note

REPEAT STEPS (32) AND (33) UNTIL MARK AND SPACE SHIFTS ARE IDENTICAL.

(34) To offset the photo shift to rest condition (1000 cps above 200kc), turn DEVIATION and PHOTO CALIBRATE controls to max cw position. Place function switch in PHOTO position. With 0 volts input to grid of V-809, adjust PHOTO BALANCE for plus (+) 1000 cycle shift. With plus (+) 1 volt input to grid of V-809 adjust PHOTO CALIBRATION control for minus (-) 1000 cycle shift.

e. EXCITER - I.P.A.

(1) GENERAL.--The exciter circuits have been carefully aligned at the factory and should require no further adjustment unless the equipment has been subject to extremely rough handling or it has been necessary to replace components within the frequency multiplier or intermediate amplifier circuits. Satisfactory alignment is indicated when a reading of not less than 15 ma is obtained on the grid of V-1104/5 over the entire frequency range of the transmitter. (Refer to (4), below.) If the grid drive is lower than this value, do not attempt any adjustment of the trimmers until all other probable causes of low excitation have been carefully checked. Only realign the exciter circuits as a last resort. Check to determine if a crystal of proper frequency is being used. Before adjusting any of the inductance or capacitance trimmers in the tank circuits, measure the voltage on each element of each tube and compare the voltages with those given in the table 7-4. Check each tube by replacing with a tube known to be in good condition. Turn the transmitter on after each replacement and check the power amplifier grid current. If all voltages appear to be normal and all exciter tubes are in good condition, it will be necessary to realign the exciter tank circuits to bring the excitation up to normal (20 ma).

(2) ADJUSTMENT OF REGULATED POWER SUPPLY.

Note

REMOVE EXCITER-I.P.A. FROM CABINET AND CONNECT TEST CABLES.

(a) Operate MAIN CIRCUIT BREAKER, FILAMENT, and PLATE switches to ON.

CAUTION

BEFORE OPERATING PLATE SWITCH BE CERTAIN THAT THE PA PLATE VOLTAGE SWITCH IS IN THE CALIBRATE POSITION.

(b) Obtain +225 voltage reading at pin three on V-1106 by adjusting R-1146.

(c) Remove V-1101 through V-1105 tubes. Connect voltmeter and AC ripple meter across regulated +225 V output. Apply 100 ma load by connecting a 2250-ohm, 25 watt resistor across output. Output should not vary by more than p/m one volt; ripple should be less than 10 millivolts r.m.s.

(d) Remove the load.

(3) KEYER CHECK.

(a) MAIN CIRCUIT BREAKER, FILAMENT, and PLATE switches ON. The PA PLATE VOLTAGE switch in CALIBRATE.

(b) Tubes V-1101 through V-1105 should be removed from their sockets.

(c) Dial A-1.

(d) Operate CARRIER key to NORMAL.

(e) Measure voltage on pin six of V-1202; it should be less than one volt DC, or zero.

(f) Measure voltage on pin six of V-1203; it should be -70V, +10V DC.

(g) Operate CARRIER key to LOCKED position.

(h) Voltage at pin six of V-1202 should now be -70V, ±10V DC.

(i) Voltage at pin six of V-1203 should be less than one volt, or zero.

(j) Operate CARRIER key to MOMENTARY position. Voltages should agree with values in (h) and (i), above.

(k) Operate CARRIER key to NORMAL position. Dial A-4. Voltages should agree with values given in (e) and (f), above.

(l) Dial A-1. Operate CARRIER key on Audio Frequency Amplifier AM-1150/FRT-15B. Voltages should agree with values given in (h) and (i) above.

(4) ALIGNMENT OF RF STAGES.

Note

EXCITER TRACKING METER ON GRID OF V-1104/5 SHOULD READ APPROXIMATELY BETWEEN "3" AND "6" WHEN MULTIPLIER STAGES ARE ALIGNED. A MUCH LOWER READING IS AN INDICATION OF MIS-TRACKING.

(a) All power OFF.

(b) Insert all tubes in Exciter - I.P.A. chassis and turn all DRIVE ADJUSTMENT shafts on front panel to full cw direction.

(c) Connect a signal generator having a two volt output to J-1103. Connect VTVM at grid of either V-1104 or V-1105. Apply power.

(d) Tune output stage of V-1101 at 2 Mc by adjusting slug in L-1101. Tune this stage at 4 Mc by adjusting trimmer capacitor C-1105.

(e) Tune output stage of V-1102 at 4 Mc by adjusting C-1114. No adjustment necessary at low end (2 Mc.)

(f) Tune output stage of V-1103 at 2 Mc by adjusting slug in L-1110. Tune this stage at 4 Mc by adjusting C-1120.

(g) Now refer to Table 7-2 where it will be observed that band one has been aligned. Use the values of frequency given in this table for tuning the remaining four bands.

Note

WHEN TUNING V-1101 OUTPUT STAGE ON BAND TWO, A COMPROMISE MUST BE STRUCK WITH BAND ONE ADJUSTMENT OF L-1101. THE SAME APPLIES FOR BANDS THREE AND FIVE WHERE THE ADJUSTMENT OF L-1102 SHOULD BE SET FOR OPTIMUM TUNING ON EACH OF THE TWO BANDS. THEN, WHEN TUNING V-1102 OUTPUT, OPTIMUM TUNING ON BANDS THREE AND FIVE SHOULD BE MET IN ADJUSTING L-1106. AFTER THE CAPACITOR TRIMMERS ARE ONCE SET, IT IS NOT NECESSARY TO READJUST THEM ON SUBSEQUENTLY TUNED BANDS.

TABLE 7-2. FREQUENCY BANDS IN EXCITER—I.P.A.

FREQUENCY RANGE OUTPUT (Mc)

BAND	STAGE 1 V-1101	STAGE 2 V-1102	STAGE 3 V-1103
1 (2-4 Mc)	2-4	2-4	2-4
2 (2-4 Mc)	2-4	4-8	4-8
3 (2-4 Mc)	4-8	8-16	8-16
4 (2-3 Mc)	4-6	8-12	16-24
5 (3-4 Mc)	6-8	12-16	24-32

Note

ALLOW FIVE PERCENT OVERLAP ON ALL BANDS. IN ALL CASES OUTPUT OF V-1103 STAGE MUST BE IN EXCESS OF 80 VOLTS ON ALL FREQUENCIES. BANDS TWO AND THREE MAY RENDER MORE THAN 125 VOLTS WITH A TWO VOLT INPUT.

(5) DRIVE ADJUSTMENT.

(a) Reassemble the Exciter - I.P.A. chassis to the cabinet.

(b) After the Exciter - I.P.A. Power Amplifier, and Output Antenna Network circuits are tuned, operate the MAIN CIRCUIT BREAKER, FILAMENT, and PLATE switches to ON. Operate PA PLATE VOLTAGE to CALIBRATE.

(c) The PA GRID meter should read approximately 120 ma, ±10%. Adjust the DRIVE ADJUSTMENT potentiometers R-1114 through R-1117 and R-1161 for this meter value on each of the five bands in the Exciter - I.P.A.

f. PA CATHODE METER CALIBRATION.

(1) Operate MAIN CIRCUIT BREAKER, FILAMENT, and PLATE switches to ON. Operate PA PLATE VOLTAGE switch to CALIBRATE.

(2) After the intermediate power amplifier, and the power amplifier grid are tuned, adjust R-1304 until the PA CATHODE meter reading equals the sum of the readings on the PA GRID and the PA SCREEN meters. Potentiometer R-1304 is located behind the hinged panel, left side in the Power Amplifier unit.

g. CHANNEL INDICATOR M-402, CALIBRATION.

(1) Check voltages from the positive terminal of the CHANNEL INDICATOR meter M-402 to ground for each of the ten channels.

(2) Starting with channel one (dial 1), the voltage should be approximately +10V DC, and increase +10V DC for each additional channel dialed; a total of +100V DC for channel ten.

(3) With +50V DC (channel five), adjust R-402 until meter M-402 reads "5".

4. AUTOTUNE SYSTEM ADJUSTMENT.

a. GENERAL.—While the autotune heads and drive mechanism have been designed and constructed to give many hours of trouble free service and were properly adjusted before leaving the factory, some maintenance and adjustment of the units may be necessary to maintain dependable and efficient operation. If it becomes necessary to replace parts of a unit, it may be necessary to make some adjustments to obtain proper synchronization between the repaired unit and the other autotune units in the transmitter.

The purpose of synchronizing autotune heads under any operating condition within the design limits of the transmitter.

b. SYNCHRONIZATION CHECK.—In the event it becomes necessary to remove an autotune head or control unit for purposes of maintenance, it will be necessary to synchronize the repaired (or replaced) head to the system. However, the system will have to be synchronized upon re-installation of the control unit. If there is reason to believe that the autotune units are not synchronized, proceed to check the system in the following manner.

(1) RADIO FREQUENCY AMPLIFIER AM-1116/FRT-15B.

(a) Check to be certain that all power is off.

(b) Open the hinged panel on each of the following chassis: (1) Antenna Matching Network, (2) Power Amplifier, and (3) Exciter-I.P.A. Also, remove the blank panel located at the bottom front of this bay.

(c) Manually rotate the drive shaft ccw until all cam drums are set in normal driving motion.

Note

DRIVE SHAFT ROTATION IS VIEWED LOOKING DOWN FROM THE TOP OF THE BAY.

(d) Continue to rotate the shaft until the stop ring drum has reached home stop and has ceased to turn.

(e) Connect an ohmmeter from ground to contact five on the seeking switch located on the control unit (0-1114).

(f) Continue to rotate the shaft slowly and observe when the number five contact on the control unit is grounded. Stop rotating the shaft at the moment the ground contact is established.

(g) If the heads are synchronized, the number five pawl in each head (count the pawls from the front of the head, omitting the first, manual pawl) will just drop as the seeking switch contact is established.

(h) All the number five pawls must drop into place with a "clicking" sound, at the same time that the control unit's seeking switch makes number five contact. Any head that fails to perform in this manner is not in synchronization with the system. Disconnect the ohmmeter.

(i) Next, operate MAIN CIRCUIT BREAKER and FILAMENT ON switches, and dial a channel number. Visually examine all heads in the AM-1116/FRT-15 to determine if their respective pawls have dropped into the corresponding channel cam drum slots. It is recommended that channels one, five, and ten be dialed for the purpose of this check. Thus, pawls one, five, and ten should drop each time their corresponding channel is dialed. Any head whose corresponding pawl fails to drop is not synchronized with the system. Refer to par. c., (2), below.

(2) RADIO FREQUENCY OSCILLATOR O-317/FRT-15B, AND RADIO FREQUENCY MODULATOR MD-245/FRT-15B.

(a) With all power off, unlock the head to be checked and rotate the manual tuning knob first fully ccw and then fully cw. Lock the head. If the dial does not rotate and operation of the locking bar secures the head, this unit (head) is synchronized. Should the dial move with the rotation of the locking bar while attempting to lock the head, it is an indication that this unit is not synchronized. Refer to par. c., (1).

(b) With power on, manually turn the head to be checked to a known setting. Dial a different channel setting. Dial the channel number corresponding to the manually fixed setting and observe that the head stops at this particular channel setting. If the head does not automatically return to the original manually set channel, this unit is not synchronized. Refer to par. c., (1).

c. SYNCHRONIZATION ADJUSTMENT.

(1) RADIO FREQUENCY AMPLIFIER AM-1116/FRT-15B.

(a) SEEKING SWITCH, S-1104.

1. With power off, rotate shaft ccw until the number five channel can be read on the control unit 0-1114 dial. If the dial was on five to start, rotate the shaft until the dial returns to five.

Note

THE HEADS ARE UNIFORMLY ASSEMBLED SO THAT THEY ARE SYNCHRONIZED TO EACH OTHER. ALL AUTOTUNE HEADS ARE FACTORY ASSEMBLED WITH THE CAM DRUM ADJUSTMENT SET SCREWS ACCESSIBLE FROM THE FRONT ON CHANNEL NUMBER FIVE; FOR THIS REASON, SYNCHRONIZING SHOULD ORDINARILY BE DONE ON CHANNEL NUMBER FIVE. ALL FOLLOWING INSTRUCTIONS ASSUME THAT SYNCHRONIZING IS BEING DONE ON CHANNEL NUMBER FIVE, AND MUST BE MODIFIED IF ANY OTHER CHANNEL IS BEING USED. DISCONNECT P-1302 AND P-1401 FROM THE ANTENNA MATCHING NETWORK AND THE POWER AMPLIFIER BEFORE ATTEMPTING ANY SYNCHRONIZATION ADJUSTMENTS IN THE AM-1116/FRT-15B BAY. THIS IS TO PREVENT ANY POSSIBILITY OF THE MOTOR DRIVES B-1301, B-1302, B-1401, B-1402 FROM RUNNING.

2. Observe that the wiper arm on S-1104B is centered over contact five.

Note

CONTACT FIVE HAS A WHITE WITH YELLOW TRACER WIRE COLOR CODING CONNECTED TO IT.

3. Connect an ohmmeter across the breaker contacts in the control unit. The ohmmeter should indicate a short across the breaker contacts. If a short does not exist, loosen the locking screw *(figure 7-7.)* and adjust the breaker plate until the short is indicated. Tighten the locking screw.

(b) AUTOTUNE HEADS.

1. Power off. Rotate the shaft until the number five pawl is just ready to fall in the associated cam drum slot.

2. Loosen set screws in the rear collar *(figure 7-6.)*, located behind the cam drum.

3. Turn the collar cw as far as it will go and push the collar toward the rear of the head-holding it there while performing the next step.

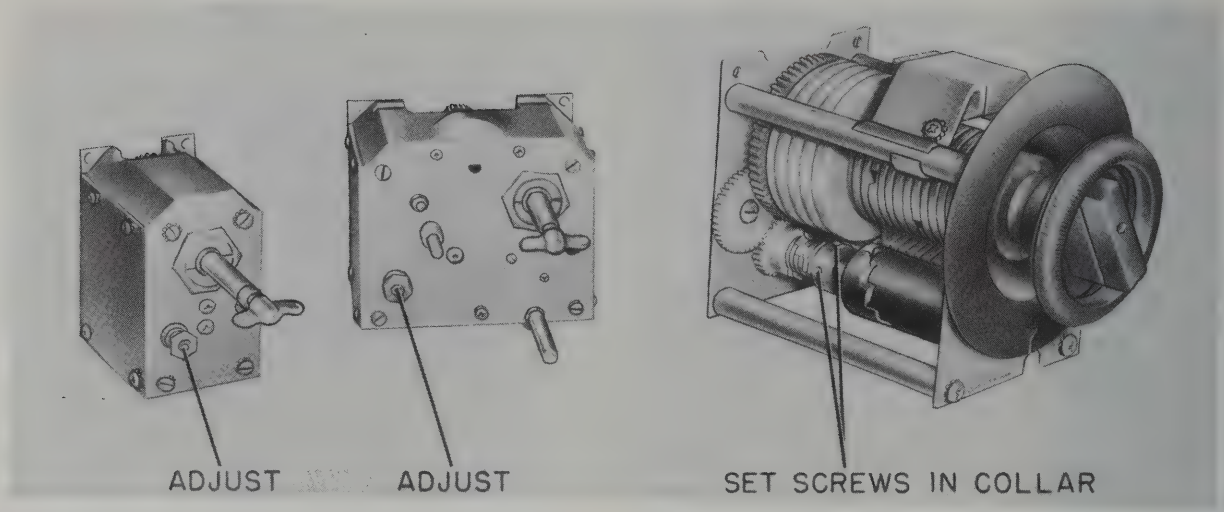


Figure 7-6. Autotune Heads Synchronization

4. Insert a 0.006-inch feeler gage between the front of the collar and the washer that is present there. Tighten set screws in collar with 0.006-inch clearance setting. Remove gage. Check synchronization (refer to par. 4., b.).

Note

IF EITHER 0-1330 AND, OR 0-1426 REQUIRED SYNCHRONIZATION, DIAL CHANNEL FIVE AND OBSERVE THE NUMBER FIVE CONTACT (S) ON S-1303 AND, OR S-1403 TO BE CERTAIN THE WIPER ARM ASSOCIATED WITH THE SWITCH IS ON CONTACT NUMBER FIVE. CONTACT NUMBER FIVE CAN BE IDENTIFIED BY THE WHITE WITH YELLOW TRACER WIRE(S) CONNECTED THERETO. IN THE EVENT THAT THE WIPER(S) IS NOT ON CONTACT FIVE, LOOSEN THE SET SCREWS IN THE SWITCH-TO-HEAD SHAFTING AND ROTATE THE SWITCH SHAFT UNTIL THE WIPER IS ON CONTACT NUMBER FIVE. SECURE THE SWITCH SHAFT TO THE HEAD CUTPUT SHAFT WITH THE SET SCREWS.

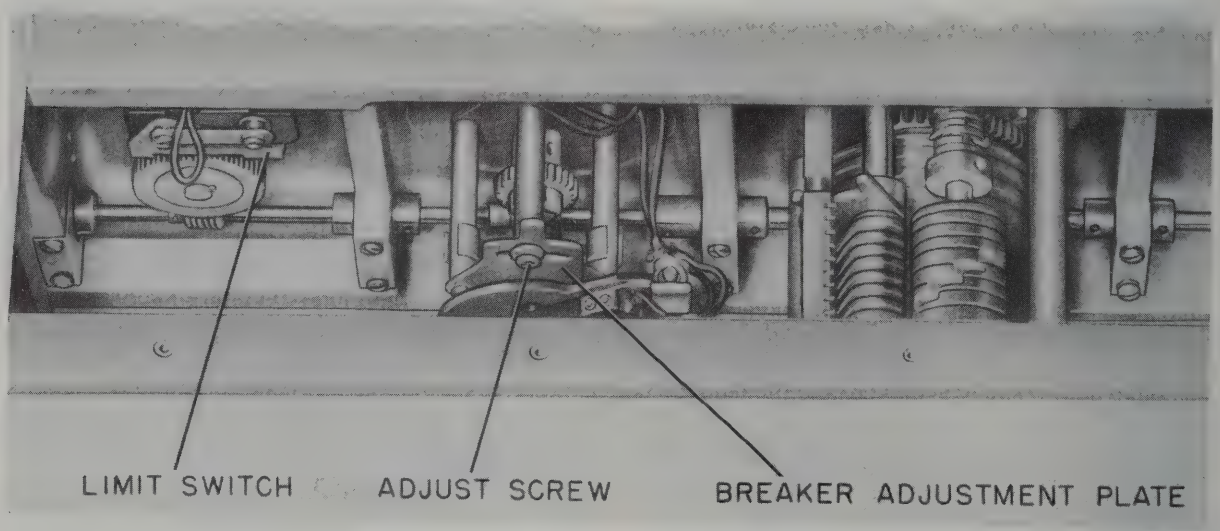


Figure 7-7. Control Unit Synchronization

(c) INTER-CHASSIS.

1. After the units on the Exciter-I.P.A. are synchronized, units on other chassis in the bay can be synchronized to the Exciter-I.P.A. in the following manner.

2. Determine whether the chassis units to be synchronized are either ahead of, or lag the Exciter-I.P.A. by rotating the drive shaft and observing the action of the number five pawls on the units involved.

3. Uncouple the drive shaft from the line shaft belonging to the chassis involved in the synchronization.

4. Rotate the uncoupled line shaft cw when head(s) are ahead and ccw when they lag the units in the Exciter-I.P.A.

Note

ROTATION IS VIEWED FROM TOP OF CABINET LOOKING DOWN.

5. Observe the part of the drive shaft that is not uncoupled from the line shaft. Three complete revolutions of the drive shaft correspond to one channel movement.

6. Re-install and couple the inter-chassis vertical drive shaft segment.

7. Dial a channel that is different from the one just synchronized, but preferably four, five or six.

8. Compare the pawl settings on the chassis being synchronized with the pawl setting in the EXCITER TUNING head 0-1118. Repeat steps 2. through 6., above as often as necessary until harmony exists. The inter-chassis synchronization will then be complete in the AM-1116/FRT-15B bay.

(2) RADIO FREQUENCY OSCILLATOR 0-317/FRT-15B AND RADIO FREQUENCY MODULATOR MD-245/FRT-15B.

(a) GENERAL.

Note

PERFORM THE STEPS IN PARS. 1 THROUGH 4. BELOW BEFORE PROCEEDING WITH PARS. (b) AND, OR (c).

1. Separate front panel from chassis.

2. Rotate line shaft in direction causing ratchets in head(s), and the control unit(s) to drive in cw direction - viewed from front. Continue rotation until red flag, observed through hole in control unit cover, disappears and then reappears with a sudden snap.

3. Stop rotating the line shaft, as near as possible, at the point where the flag snaps into position.

4. Rotate line shaft in opposite direction 6-3/8 revolutions, and stop.

(b) SINGLETURN HEADS 0-109, 0-808.

1. Insert a number ten Bristo wrench in end of the cam drum shaft *(figure 7-6.)*

2. Rotate the cam drum two to four clicks in the ccw direction. Reverse rotation and turn drum as far as it will go.

3. Loosen the nut on the end of the cam drum shaft.

4. Rotate shaft as far as it will go in a cw direction.

Note

OBSERVE STOP RING PAWL - IT MUST BE ENGAGED WITH STOP RING DURING THIS FINAL PROCEDURE OF ROTATION.

5. Tighten the nut.

6. Refer to paragraph b. above for final check.

(c) MULTITURN HEADS 0-110, 0-110A.

1. Insert a number ten Bristo wrench in end of the cam drum shaft *(figure 7-6.)*

2. Rotate wrench two to four clicks in cw direction. Reverse rotation and turn drum as far as it will go.

3. Loosen the nut on the end of the cam drum shaft by turning in a cw direction.

4. Rotate shaft as far as it will go in a ccw direction.

Note

OBSERVE STOP RING PAWL - IT MUST BE ENGAGED WITH STOP RING DURING THIS FINAL PROCEDURE OF ROTATION.

5. Tighten the nut.

6. Refer to paragraph b. above for final check.

d. RELAYS.— Dependable operation of the autotune system requires proper operation of the autotune relays. In case of failure on the part of any autotune system relay, it is recommended that the entire relay be replaced. The only maintenance that should be performed is the periodic use of a burnishing tool to clean the surfaces of contacts.

5. MISCELLANEOUS

a. CLEANING.—The greatest enemy to uninterrupted service in equipment of this type is corrosion and dirt. Corrosion is accelerated by the presence of dust and moisture on the component parts in the assembly. It is impossible to keep moisture out of the equipment in certain localities, but foreign particles and dust can be periodically removed by means of a soft brush and a dry oil-free jet of air. Although the equipment is equipped with two dust filters, that will remove most of the dust particles, there is always a slight accumulation of dust in the vicinity of circuits at a high potential above ground. Remove the dust by the above method as often as a perceptible quantity accumulates at any place in the equipment. It is very important that rotating equipment be kept free from dust to prevent undue wear. Likewise, variable capacitor plates should be kept free from dirt to avoid flashovers on modulation peaks.

b. ROUTINE CHECKS.— Routine inspection schedules should be set up for periodic examination of the equipment. This inspection should include examination of the mechanical system for signs of possible wear, and of the electrical system for any signs of overheating. A check on the emission of all electron tubes should be made at least every 1000 hours of service. After the emission check, examine the prongs on all tubes to make sure that all are free from corrosion. When the tubes are replaced in the proper sockets, a thorough check should be made to determine that good electrical contact is made between the tube prong and socket. Check all relays for proper operation and inspect relay contacts to make certain that the contact surfaces are clean and free of pits and projections. Make certain that the contacts of all receptacles and plugs on individual units are clean and that these make firm mechanical connections between one another. Set screws on tap switch drives and those that are associated with the autotune driving mechanism should be checked, and tightened when necessary.

c. FUSES.—The equipment is supplied with fuses of the correct rating in each position. Fuses which have failed should be replaced with spares only after the circuit in question has been carefully examined to make certain that no permanent fault exists. Always replace a fuse with one having exactly the same rating. Do not replace a quick-acting fuse with one of the "Slo-Blo" type.

d. BLOWERS AND AIR FILTERS. — Two blower motors require lubrication about every six months. Use only Socony-Vacuum Gargoyle Arctic C Light oil, or equal. The air filters in this equipment are of the washable type. When loaded with collected matter they should be removed from the frames of the rear doors. The filters should then be immersed in any solvent such as gasoline or a solution of Tri-Sodium-Phosphate and water or Climalene and water, after which the filters should be allowed to dry very THOROUGHLY. Then each filter unit should be recharged as follows: Dip the unit in an oil of approximately SAE 20 or 40 viscosity when used in temperatures of 20°F. or higher, or SAE 10 viscosity when used between 19°F. above and 45°F. below zero. The filter should then be drained THOROUGHLY to remove excess oil. The correct and best method to drain the filter is to lay it flat with the "approach face" (air entering side) down.

e. TEST CABLES.—Test cables are supplied with the equipment. The cables are equipped with the same type of plugs and receptacles as are used in the transmitter proper. These cables are provided to aid in the checking of the following:

(1) Modulator: cannot check plate circuit due to absence of forced air and plate jumpers.

(2) Audio Frequency Amplifier AM-1150/FRT-15B.

(3) Radio Frequency Oscillator 0-317/FRT-15B.

(4) Radio Frequency Modulator MD-245/FRT-15B.

(5) Radio Frequency Oscillator 0-324/FRT-15B.

(6) Excitation Control.

(7) Power Supply PP-1197/FRT-15B.

(8) Antenna Matching Network: test only autotune system motors and functioning of driven elements.

(9) Power Amplifier: same as (1), above.

(10) Exciter - I.P.A.

(11) Autotune control.

When servicing any one of the above units, remove the unit from the cabinet, place on the work bench, insert the cable plug into the plug receptacle in the transmitter cabinet and insert the plug on the other end of the cable in the receptacle on the unit. Before applying voltage, check the connectors on both ends of the cables to make certain that each cable is connected between the proper connector on the unit and the proper connector in the transmitter.

WARNING

EXTREME CARE SHOULD BE EXERCISED WHEN OPERATING UNITS ON THE TEST BENCH. THE VOLTAGES EMPLOYED IN THIS EQUIPMENT ARE DANGEROUS TO HUMAN LIFE.

6. COMPONENT CHARACTERISTICS

a. ELECTRON TUBES.--In the course of trouble shooting in the equipment, it may be necessary to replace a defective or inoperative electron tube. It should be borne in mind, however, that the tube is a vital part of the equipment and that, on occasion no field substitute is available. Therefore, before discarding any electron tube, the technician should make very sure that replacement is the only remedy for the trouble. The tube should be checked in a standard tube tester or in actual operation, and should be discarded only if it shows one or more of the following faults:

(1) Low emission; sufficient to prevent minimum efficient operation.

(2) No filament continuity.

(3) Microphonics; noise interference with operation.

(4) Shorted element.

(5) Intermittent shorts; erratic operation and interruption of transmission.

When it is definitely ascertained that the tube is valueless and requires replacement, observe the following rule: "ALL TUBES OF A GIVEN TYPE SUPPLIED WITH THE EQUIPMENT SHALL BE CONSUMED PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK."

The operating characteristics and resistance and voltage measurements of all tube types used in the equipment are summarized in tables 7-3, 7-4, and 7-5.

b. CRYSTAL DATA.

(1) RADIO FREQUENCY OSCILLATOR 0-324/FRT-15B.

(a) JAN TYPE CR-27/U, (Y-901/10).

(b) The oscillator is designed to operate over the range from 2.0 to 4.2 Mc.

(c) Frequency tolerance should be ±0.00002 parts of nominal frequency at 70°C, ±1°C (+158°F, ±1°F).

(d) Oven temperature should be 70°C, ±1°C (+158°F, ±1°F).

(e) Crystal uses standard JAN TYPE CR-27/U crystal holder.

(2) RADIO FREQUENCY OSCILLATOR 0-317/FRT-15B.

(a) The crystal oscillator portion is designed for 100 kc.

(b) Frequency tolerance should be ±0.00003 parts of nominal frequency at 60°C, ±1°C (+140°F, ±1.8°F).

(c) Oven temperature 60°C, ±1°C (+140°F, ±1.8°F).

(d) Crystal uses standard JAN TYPE CR-27/U crystal holder.

(3) RADIO FREQUENCY MODULATOR MD-245/FRT-15B.

(a) The crystal oscillator portion is designed for 200 kc.

(b) Frequency tolerance should be ±0.00002 parts of nominal frequency at 70°C, +1°C (+158°F, ±1.8°F).

(c) Oven temperature 70°C, ±1°C (+158°F, ±1.8°F).

(d) Crystal uses standard JAN TYPE CR-27/U crystal holder.

c. WINDING DATA.--Table 7-6 presents the winding data for inductors, reactors, chokes and transformers used in this equipment.

d. PHOTOGRAPHS AND DRAWINGS.--Component parts location photographs, in addition to those up to this point, are presented in the pages that follow table 7-6 and precede the overall schematic diagrams. An interconnection diagram is presented in Section 3 *(see figure 3-3.)*.

TABLE 7-3. RESISTANCE MEASUREMENTS

CONDITIONS OF MEASUREMENTS:

1. All power off.
2. All external cables disconnected.
3. All readings taken between pin (or cap) and chassis ground.
4. 20,000-ohm per volt meter used.
5. Readings are expressed in ohms, where "K" equals 1000, and "M" equals 1,000,000.

CIRCUIT SYMBOL	PIN NUMBERS									CAP
	1	2	3	4	5	6	7	8	9	
MODULATOR AND AUDIO FREQUENCY AMPLIFIER AM-1150/FRT-15B CONTROLS SET AS FOLLOWS: INPUT GAIN --- Max. full clockwise MCW Gain --- Max. full clockwise LIMITER GAIN --- Max. full clockwise LOCAL-REMOTE --- --- LOCAL SIGNAL KEY --- ---- Normal										
V-301	740	35K	1K	700	35K	1K	FIL.	FIL.	----	----
V-302	INF.	FIL.	33K	0	INF.	33K	FIL.	0	----	INF.
V-303	100K	FIL.	33K	INF.	100K	33K	FIL.	INF.	----	100K
V-304	INF.	FIL.	40K	1.5K	1K	30K	FIL.	40K	----	----
V-305	INF.	FIL.	INF.	INF.	INF.	INF.	FIL.	INF.	----	----
V-306	100K	INF.	3.3K	100K	INF.	3.3K	FIL.	FIL.	----	----
V-307	100K	INF.	3.3K	100K	INF.	3.3K	FIL.	FIL.	----	----
V-308	100K	33K	2K	47K	51K	4K	FIL.	FIL.	----	----
V-309	0.05 ohms	400K	INF.	400K	0.05	----	----	----	----	100K
V-310	0.05 ohms	400K	INF.	400K	0.05	----	----	----	----	100K
RADIO FREQUENCY OSCILLATOR O-317/FRT-15B CONTROLS SET AS FOLLOWS: PLATE --- OFF SET UP - OPERATE --- OPERATE Output attenuator --- Max. full clockwise										
V-101	0	2.2K	100K	82K	0	85K	100K	0	FIL.	----
V-102	0	33K	27K	27K	0	27K	27K	33K	FIL.	----
V-103	0	33K	27K	27K	0	27K	27K	33K	FIL.	----
V-104	47K	100	0	FIL.	27K	100K	100	----	----	----
V-105	68K	560	0	FIL.	27K	80K	560	----	----	----
V-107	100K	2.2K	0	FIL.	34K	34K	2.2K	----	----	----
V-108	470K	150	0	FIL.	22K	22K	100K	----	----	----
V-109	94	150	FIL.	0	27K	27K	150	----	----	----
V-110	4.7K	150	FIL.	0	27K	27K	47	----	----	----
V-111	56	150	FIL.	0	27K	27K	150	----	----	----
V-112	50K	220	0	FIL	10K	47K	1 meg.	----	----	----
V-113	470K	560	0	FIL.	35K	360K	560	----	----	----
V-114	560	100K	560	0	FIL.	8.4K	10K	560	8.4K	----
V-115	FIL.	82K	30K	27K	0	27K	27K	82K	0	----
V-116	FIL.	82K	30K	27K	0	27K	27K	82K	0	----

TABLE 7-3. RESISTANCE MEASUREMENTS (Cont'd)

CIRCUIT SYMBOL	PIN NUMBERS									CAP
	1	2	3	4	5	6	7	8	9	
V-117	FIL.	56K	30K	27K	0	27K	27K	56K	0	----
V-118	47K	470	0	FIL.	39K	39K	470	----	----	----
V-119	1.6K	600K	1.6K	FIL.	0	9K	8K	1.6K	9K	----
V-120	1.6K	600K	1.6K	FIL.	0	9K	8K	1.6K	9K	----
V-121	1.6K	600K	1.6K	FIL.	0	8K	9K	1.6K	8K	----
V-122	1.6K	600K	1.6K	FIL.	0	8K	9K	1.6K	8K	----
V-123	FIL.	1.2K	300K	560K	0	560K	300K	1.2K	0	----
V-124	FIL.	1.2K	300K	560K	0	560K	300K	1.2K	0	----
V-125	330K	330K	0	FIL.	330K	INF.	330K	----	----	----
V-126	330K	330K	0	FIL.	330K	INF.	330K	----	----	----
V-127	70K	220	FIL.	0	10K	33K	33K	----	----	----
V-128	1 meg	220	FIL.	0	33K	33K	220	----	----	----
V-129	100K	470	FIL	0	42K	82K	470	----	----	----
Oven Socket	0	0	100K	INF.	INF.	1.3K	1.3K	----	----	----

RADIO FREQUENCY MODULATOR MD-245/FRT-15B
CONTROLS SET AS FOLLOWS:

S-801---OFF
S-802---PLATE CURRENT
S-803---CARRIER
INPUT ATTENUATOR R-804 - Max. cw pos.
BALANCE ADJUST R-816 - Max. cw pos.
OUTPUT ATTENUATOR R-830 - Max. cw pos.
PHOTO BALANCE R-806 - Max. cw pos.
A. C. BALANCE R-857 - Max. cw pos.
D. C. BALANCE R-899 - Max. cw pos.
S-804---X-1 position
S-805---open
PHASE MODULATION---OFF
SHIFT ADJUST R-854/56 - Max. cw pos.
DEVIATION CONTROL R-890 - Max. cw pos.
FREQUENCY ADJUST R-868 - Max. cw pos.
DEGENERATION CONTROL R-869 - Max. cw pos.
SPACE ADJUST R-839 - Max. cw pos.
MARK ADJUST R-858 - Max. cw pos.
PHOTO CALIBRATE R-846 - Max. cw pos.

V-801	68K	200	0	FIL.	50K	42K	56K	----	----	----
V-802	68K	200	0	FIL.	50K	52K	56K	----	----	----
V-803	17K	68	0	FIL.	29K	63K	68	----	----	----
V-804	0	6K	0	FIL.	0	26K	28	0	26K	----
V-805	60K	0	0	FIL.	60K	INF.	0	----	----	----
V-806	0	60K	230K	90K	0	110K	100K	0	FIL.	----
V-807	200K	5K	0	FIL.	INF.	INF.	5K	----	----	----
V-808	100K	0	FIL.	FIL.	450K	1.6 meg	1.4K	----	----	----
V-809	85K	0	FIL.	FIL.	75K	140K	38K	----	----	----
V-810	85K	0	FIL.	FIL.	75K	140K	38K	----	----	----
V-811	62K	100	0	0	0	62K	27K	0	FIL.	----
V-812	82K	82K	0	FIL.	27K	27K	200	----	----	----

RADIO FREQUENCY OSCILLATOR O-324/FRT-15B
CONTROLS SET AS FOLLOWS:

CRYSTAL SELECTOR----Any channel
AMP-OSC----------OSC

V-901	47K	200	0	FIL.	INF.	INF.	200	----	----	----
V-902	0	FIL.	INF.	1 meg	156	INF.	FIL.	INF.	----	----
V-903	INF.	0	INF.	INF.	INF.	INF.	INF.	INF.	----	----
V-904	INF.	INF.	INF.	INF.	INF.	INF.	INF.	INF.	----	----

TABLE 7-3. RESISTANCE MEASUREMENTS

CIRCUIT SYMBOL	PIN NUMBERS									CAP
	1	2	3	4	5	6	7	8	9	
POWER SUPPLY PP-1197/FRT-15B CONTROLS SET AS FOLLOWS: OFF - ON ---------- OFF Meter Switch ---------- +240 ADJ. +240 ---------- Set for 240 volt out ADJ. +160 ---------- Set for 160 volts out										
V-1001	INF.	133K	INF.	7	INF.	7	INF.	133K	----	----
V-1002	INF.	133K	INF.	7	INF.	7	INF.	133K	----	----
V-1003	280K	INF.	7	7	INF.	280K	7	----	----	----
V-1004	0	280K	INF.	280K	0	INF.	280K	----	----	----
V-1005	600K	133K	95K	600K	133K	95K	FIL.	FIL.	----	----
V-1006	600K	133K	95K	600K	133K	95K	FIL.	FIL.	----	----
V-1007	600K	133K	95K	600K	133K	95K	FIL.	FIL.	----	----
V-1008	225K	0	FIL.	FIL.	600K	33K	0	----	----	----
V-1009	INF.	FIL.	95K	95K	950K	INF.	FIL.	44K	----	----
V-1010	340K	0	FIL.	FIL.	95K	33K	0	----	----	----
POWER AMPLIFIER										
V-1301	3	INF.	INF.	INF.	3	----	----	----	----	INF.
V-1302	3	INF.	INF.	INF.	3	----	----	----	----	INF.
EXCITER----I. P. A. CONTROLS SET AS FOLLOWS: Drive potentiometers in max. cw pos. KEY in normal position Band switch in pos. #1										
V-1101 (6V6GT)	0	0	8500	9500	35000	INF.	.1	0	----	----
V-1102 (GV6)	0	0	8500	20000	44000	INF.	.1	950	----	----
V-1103 (807)	0	8000	17000	300	.1	----	----	----	----	82000
V-1104 (4-65A)	2.8	8000	INF.	INF.	INF.	8000	2.8	----	----	INF.
V-1105 (4-65A)	2.8	8000	INF.	INF.	INF.	8000	2.8	----	----	INF.
V-1106 (6AS7)	500,000	82,000	7500	500,000	82,000	7500	.1	.1	----	----
V-1107 (6SH7)	INF.	.1	0	95,000	0	43,000	0	500,000	----	----

TABLE 7-3. RESISTANCE MEASUREMENTS (Cont'd)

CIRCUIT SYMBOL	PIN NUMBERS									CAP
	1	2	3	4	5	6	7	8	9	
V-1201 (12AU7)	200,000	240,000	5600	.1	.1	210,000	200,000	0	0	----
V-1202 (12AU7)	10,000	800,000	110,000	.1	.1	10,000	800,000	110,000	0	----
V-1203 (12AU7)	22,000	800,000	110,000	.1	.1	22,000	800,000	110,000	0	----
V-1204 (OB2)	0	110,000	INF.	110,000	0	INF.	110,000	----	----	----
POWER SUPPLY ASSEMBLY PP-1198/FRT-15B CONTROLS SET AS FOLLOWS: R-522 --- Set for +960 volts output R-526 --- Set for -127 volts output R-540 --- Set for -124 volts output R-541 --- Set for -60 volts output R-542 --- Set for -24 volts output										
V-518	FIL.	INF.	700 K	500 K	FIL.	----	----	----	----	INF.
V-519	FIL.	INF.	700 K	500 K	FIL.	----	----	----	----	INF.
V-520	FIL.	INF.	700 K	500 K	FIL.	----	----	----	----	INF.
V-521	FIL.	INF.	700 K	500 K	FIL.	----	----	----	----	INF.
V-522	FIL.	INF.	700 K	500 K	FIL.	----	----	----	----	INF.
V-523	FIL.	INF.	700 K	500 K	FIL.	----	----	----	----	INF.
V-524	400 K	525 K	FIL.	FIL.	700 K	525 K	525 K	----	----	----
V-525	525 K	INF.	INF.	INF.	525 K	INF.	INF.	----	----	----
V-526	INF.	INF.	INF.	INF.	INF.	INF.	INF.	----	----	----
V-527	INF.	INF.	INF.	INF.	INF.	INF.	INF.	----	----	----
V-528	INF.	0	INF.	0	INF.	INF.	0	----	----	----
V-529	0	7 K	INF.	7 K	0	INF.	7 K	----	----	----
V-530	26 K	INF.	INF.	26 K	----	----	----	----	----	7
V-531	26 K	INF.	INF.	26 K	----	----	----	----	----	7
V-532	INF.	INF.	INF.	INF.	----	----	----	----	----	26 K
V-533	INF.	INF.	INF.	INF.	----	----	----	----	----	26 K
V-534	INF.	INF.	INF.	INF.	----	----	----	----	----	880
V-535	INF.	INF.	INF.	INF.	----	----	----	----	----	880
V-536	INF.	100 K	INF.	100 K	----	----	----	----	----	INF.
V-537	INF.	100 K	INF.	100 K	----	----	----	----	----	INF.
V-538	INF.	100 K	INF.	100 K	----	----	----	----	----	INF.
V-539	INF.	INF.	INF.	INF.	----	----	----	----	----	1 ohm
V-540	INF.	INF.	INF.	INF.	----	----	----	----	----	1 ohm
V-541	INF.	INF.	INF.	INF.	----	----	----	----	----	1 ohm
TRANSMITTER CONTROL C-1501/FRT-15B CONTROL SET AS FOLLOWS: GAIN control max. cw position										
V-401	INF.	FIL.	280,000	INF.	1500	INF.	FIL.	3300	----	----
V-402	INF.	FIL.	10,000	INF.	550,000	INF.	FIL.	0	----	----
V-403	INF.	225,000	INF.	5200	INF.	5200	INF.	225,000	----	----
V-405	INF.	FIL.	225,000	225,000	500,000	INF.	FIL.	10,000	----	----
V-405	INF.	FIL.	0	30,000	0	33,000	FIL.	55,000	----	----
V-406	INF.	0	INF.	INF.	12,000	INF.	INF.	INF.	----	----
V-407	INF.	5000	INF.	INF.	0	INF.	INF.	INF.	----	----

TABLE 7-4. VOLTAGE MEASUREMENTS

CONDITIONS OF MEASUREMENTS:

1. All chassis power on except as noted.
2. Input line voltage set at 220 V AC.
3. All readings DC voltage unless stated AC.
4. All readings taken between pin (or cap) and chassis ground.
5. All readings taken with 20,000-ohm per volt DC; 1,000-ohm per volt AC, meter.

CIRCUIT SYMBOL	PIN NUMBERS 1	2	3	4	5	6	7	8	9	CAP
MODULATOR AND AUDIO FREQUENCY AMPLIFIER AM-1150/FRT-15B CONDITIONS: No signal input, On phone with MCW off										
V-301	0	90	1.05	0	85	1.05	FIL.	FIL.	----	----
V-302	-4.5	FIL.	42	0	-4.5	46	FIL.	0	----	-4.5
V-303	-25	FIL.	42	25	-25	46	FIL.	25	----	-25
V-304	0	FIL.	280	0	10	280	FIL.	280	----	----
V-305	0	FIL.	-25	0	-25	0	FIL.	-4.5	----	----
V-306	0	420	19	0	420	19	FIL.	FIL.	----	----
V-307	0	420	19	0	420	19	FIL.	FIL.	----	----
V-308	0	340	20.5	0	275	14	FIL.	FIL.	----	----
V-309	FIL.	960	-127	960	FIL.	----	----	----	----	4100
V-310	FIL.	960	-127	960	FIL.	----	----	----	----	4100
RADIO FREQUENCY OSCILLATOR 0-317/FRT-15B CONDITIONS: Oven Cycling, AFC ON CONTROLS SET AS FOLLOWS: PLATE --- ON; SET UP-OPERATE --- OPERATE; OUTPUT ATTENUATOR --- Max. full clockwise										
V-101	0	1.9	0	105	0	68	-.75	0	FIL.	----
V-102	0	77	70	117	0	115	70	76	FIL.	----
V-103	0	75	70	110	0	115	68	75	FIL.	----
V-104	-.15	.5	0	FIL.	60	64	.5	----	----	----
V-105	0	3.1	0	FIL.	94	140	3.1	----	----	----
V-107	0	5	0	FIL.	170	170	5	----	----	----
V-108	0	2.4	0	FIL.	100	100	0	----	----	----
V-109	0	1.35	FIL.	0	100	100	1.35	----	----	----
V-110	0	1.4	FIL.	0	85	85	0	----	----	----
V-111	0	1.3	FIL.	0	100	100	1.3	----	----	----
V-112	-7	1.2	0	FIL.	225	75	0	----	----	----
V-113	-3.4	1.25	0	FIL.	180	70	1.25	----	----	----
V-114	8	0	8	0	FIL.	147	228	8	147	----
V-115	FIL.	110	105	168	0	168	105	110	0	----
V-116	FIL.	110	105	165	0	165	105	110	0	----
V-117	FIL.	110	98	145	0	145	105	110	0	----
V-118	0	2.2	0	FIL.	105	105	2.2	----	----	----
V-119	*50-75	*25-75	*50-75	FIL.	0	230	*215-235	*50-75	230	----
V-120	*50-75	*25-75	*50-75	FIL.	0	230	*215-235	*50-75	230	----
V-121	*50-75	*25-75	*50-75	FIL.	0	230	*215-235	*50-75	230	----

* This Voltage May Vary Due To Error Signal in AFC System

TABLE 7-4. VOLTAGE MEASUREMENTS (Cont'd)

CIRCUIT SYMBOL	PIN NUMBERS 1	2	3	4	5	6	7	8	9	CAP
RADIO FREQUENCY OSCILLATOR O-317/FRT-15B--Continued										
V-122	*50 to 75	*25 to 75	*50 to 75	FIL.	0	230	*215 to 235	*50 to 75	230	----
V-123	FIL.	*. 5 to .75	*+. 25 to -. 25	*25 to 75	0	*25 to 75	*-. 25 to +. 25	*. 5 to .75	0	----
V-124	FIL.	*. 25 to .75	*+. 25 to -. 25	*25 to 75	0	*25 to 75	*-. 25 to +. 25	*. 25 to .75	0	----
V-125	*+. 25 to -. 25	*-2 to -3	0	FIL	*+1 to -1	0	*-2 to -3	----	----	----
V-126	*+. 25 to -. 25	*-5. 5 to -6. 5	0	FIL.	*+1 to -1	0	*-5. 5 to 6. 6	----	----	----
V-127	-2. 5	0	FIL.	0	227	70	0	----	----	----
V-128	0	2. 5	FIL.	0	58	70	.75	----	----	----
V-129	0	3	FIL.	0	66	125	3	----	----	----
Oven Socket	0	0	6	0	0	120 AC	120 AC	----	----	----

* This Voltage May Vary Due To Error Signal In AFC System

RADIO FREQUENCY MODULATOR MD-245/FRT-15B

CONDITION:
Oven cycling
CONTROLS SET AS FOLLOWS:

S-801--ON ---------- Max. cw pos.
S-802--PLATE CURRENT ------ Max. cw pos.
S-803--CARRIER ---------- Max. cw pos.
R-804--INPUT ATTENUATOR -- Max. cw pos.
R-816--BALANCE ADJUST ----- Max. cw pos.
R-830--OUTPUT ATTENUATOR--Max. cw pos.
R-856--PHOTO BALANCE------ Max. cw pos.
R-857--A. C. BALANCE -------- Max. cw pos.
R-899--D. C. BALANCE -------- Max. cw pos.

S-804 ---------- ---X-1 POSITION----- Max. cw pos.
S-805 ---------- ---OPEN ---------- Max. cw pos.
PHASE MODULATION---OFF---------- Max. cw pos.
R-854/56 ----------SHIFT ADJUST----- Max. cw pos.
R-890-------DEVIATION CONTROL -------- Max. cw pos.
R-868 -------FREQUENCY ADJUST --------- Max. cw pos.
R-869,-------DEGENERATION CONTROL ----Max. cw pos.
R-839 ------SPACE ADJUST ---------- Max. cw pos.
R-858--- ---MARK ADJUST---------- Max. cw pos.
R-846 --- ---PHOTO CALIBRATE---------- Max. cw pos.

V-801	0	3	0	FIL.	120	100	2	----	----	----
V-802	0	3	0	FIL.	120	75	2	----	----	----
V-803	-8	+. 7	0	FIL.	225	150	.7	----	----	----
V-804	0	-27	0	FIL.	0	200	225	0	200	----
V-805	32	0	0	FIL.	32	0	0	----	----	----
V-806	0	32	29	90	0	135	-10	0	FIL.	----
V-807	-. 6	0	0	FIL.	-1	-1	0	----	----	----
V-808	-. 1	0	FIL.	FIL.	60	17	0. 5	----	----	----
V-809	0	0	FIL.	FIL.	150	65	1. 5	----	----	----
V-810	0	0	FIL.	FIL.	150	65	1. 2	----	----	----
V-811	50	0	0	0	0	50	-. 1	0	FIL.	----
V-812	90	90	0	FIL.	0. 1	0. 1	1. 7	----	----	----

TABLE 7-4. VOLTAGE MEASUREMENTS (Cont'd)

CIRCUIT SYMBOL	PIN NUMBERS 1	2	3	4	5	6	7	8	9	CAP
RADIO FREQUENCY OSCILLATOR O-324/FRT-15B CONTROLS SET AS FOLLOWS: CRYSTAL SELECTOR ------- Any channel AMP-OSC ---------- OSC										
V-901	-5	1.3	0	FIL.	130	104	1.3	----	----	----
V-902	0	0	0	-3.5	3	150	FIL.	150	----	----
V-903	0	0	150	0	75	0	150	0	----	----
V-904	0	75	150	0	150	0	150	0	----	----
POWER SUPPLY PP-1197/FRT-15B CONTROLS SET AS FOLLOWS: OFF-ON --------- ON METER SWITCH -- Any position ADJ. ----Set +240 volts out ADJ. ----Set +160 volts out										
V-1001	0	1100 AC	0	360 AC	0	360 AC	0	1100 AC	----	----
V-1002	0	1100 AC	0	360 AC	0	360 AC	0	1100 AC	----	----
V-1003	-415	0	360 AC	360 AC	0	-415	360 AC	----	----	----
V-1004	0	-105	0	-105	0	0	-105	----	----	----
V-1005	65	490	240	65	490	240	FIL.	FIL.	----	----
V-1006	65	490	240	65	490	240	FIL.	FIL.	----	----
V-1007	65	490	240	65	490	240	FIL.	FIL.	----	----
V-1008	-3.5	0	FIL.	FIL.	64	110	0	----	----	----
V-1009	0	FIL.	230	230	125	0	FIL.	153	----	----
V-1010	-3.5	0	FIL.	FIL.	150	58	0	----	----	----
POWER AMPLIFIER CONDITION: No signal input										
V-1301	FIL.	+360	-124	+460	FIL.	----	----	----	----	4200
V-1302	FIL.	+360	-124	+460	FIL.	----	----	----	----	4200
EXCITER --- I.P.A. NOTE VOLTAGE MEASUREMENTS TAKEN WITH 1000 VOLTS REMOVED FROM PLATES OF V-1104 AND V-1105 TUBES.										
V-1101	0	0	215	23	-70	0	6.3 AC	0	----	----
V-1102	0	0	210	130	-70	0	6.3 AC	0	----	----
V-1103	0	215	0	15	6.3 AC	----	----	----	----	540
V-1104	FIL.	225	0	-65	0	225	FIL.	----	----	1000 V
V-1105	FIL.	225	0	-65	0	225	FIL.	----	----	1000 V
V-1106	39	520	225	41	520	225	0	6.3 AC	----	----
V-1107	0	6.3 AC	0	-3	0	115	0	39	----	----
V-1201	115	0	18	6.3 AC	6.3 AC	6	.7	0	0	----
V-1202	-3.8	-115	-105	6.3 AC	6.3 AC	-3.8	-115	-105	0	----
V-1203	-72	-105	-105	6.3 AC	6.3 AC	-72	-105	-105	0	----
V-1204	0	-105	0	-105	0	0	-105	----	----	----

TABLE 7-4. VOLTAGE MEASUREMENTS (Cont'd)

CIRCUIT SYMBOL	PIN NUMBERS 1	2	3	4	5	6	7	8	9	CAP
POWER SUPPLY ASSEMBLY PP-1198/FRT-15B CONDITION: All chassis plugs disconnected. CONTROLS SET AS FOLLOWS: R-222----Set for +960 volts output R-526----Set for -127 volts output R-540----Set for -124 volts output R-541----Set for -60 volts output R-542----Set for -24 volts output										
V-518	FIL.	1720	830	960	FIL.	----	----	----	----	1720
V-519	FIL.	1720	830	960	FIL.	----	----	----	----	1720
V-520	FIL.	1720	830	960	FIL.	----	----	----	----	1720
V-521	FIL.	1720	830	960	FIL.	----	----	----	----	1720
V-522	FIL.	1720	830	960	FIL.	----	----	----	----	1720
V-523	FIL.	1720	830	960	FIL.	----	----	----	----	1720
V-524	600	600	FIL.	FIL.	830	680	600	----	----	----
V-525	600	450	0	450	600	0	450	----	----	----
V-526	450	300	0	300	450	0	300	----	----	----
V-527	300	150	0	150	300	0	150	----	----	----
V-528	150	0	0	0	150	0	0	----	----	----
V-529	0	-150	0	-150	0	0	-150	----	----	----
V-530	675	0	0	675	----	----	----	----	----	0
V-531	675	0	0	675	----	----	----	----	----	0
V-532	1720	0	0	675	----	----	----	----	----	680
V-533	1720	0	0	675	----	----	----	----	----	680
V-534	0	0	0	0	----	----	----	----	----	-430
V-535	0	0	0	0	----	----	----	----	----	-430
V-536	0	2100	0	2100	----	----	----	----	----	.05
V-537	0	2100	0	2100	----	----	----	----	----	.05
V-538	0	2100	0	2100	----	----	----	----	----	.05
V-539	0	4300	0	4300	----	----	----	----	----	2100
V-540	0	4300	0	4300	----	----	----	----	----	2100
V-541	0	4300	0	4300	----	----	----	----	----	2100
TRANSMITTER CONTROL C-1501/FRT-15B CONDITIONS: 6.3 V AC Readings were taken across filament pins. Power input 115 V AC R-403 Adjusted for +125 volts on pin 8, V-404 CONTROL SET AS FOLLOWS: GAIN control max. cw position										
V-401	0	6.3 AC	+22	0	0	0	6.3 AC	+1.15	----	----
V-402	0	6.3 AC	+115	0	-1.5	0	6.3 AC	0	----	----
V-403	0	340	0	270 AC	0	270 AC	0	+340	----	----
V-404	0	6.3 AC	+340	+340	+105	0	6.3 AC	+125	----	----
V-405	0	6.3 AC	0	-1.05	0	+20	6.3 AC	+105	----	----
V-406	0	0	0	0	+72	0	0	0	----	----
V-407	0	-72	0	0	0	0	0	0	----	----

TABLE 7-5. ELECTRON TUBE CHARACTERISTICS

JAN TUBE TYPE	FIL. VOLT	FIL. AMP	PLATE VOLT	GRID NEG. VOLT	SCREEN VOLT	PLATE Ma	MAX. GRID DRIVE	SCREEN Ma	PLATE R (ohms)	Mu FACTOR	TRANS-CONDUCT-ANCE (u-ohms)	REMARKS
OA2 WA	COLD	CATH.	185			30 max. 5 min.						
OB2 WA	COLD	CATH.	133			30 max. 5 min.						
OA3/VR75	COLD	CATH.	105			40 max. 5 min.						
3B28	2.5	5.0	PEAK INVERSE 10,000			AVG 1.0A PEAK 0.25A						
4B32	5.0	7.5	PEAK INVERSE 10,000			AVG 1.25A PEAK 5.0A						
4/65A	6.0	3.5	1000	-70	250	125	170 V	40		5	4000	
4/1000A	7.5	21	4000	-115	1000	1.05A	115 V	60		7	10,000	CLASS "AB" MODULATOR
			4000	-150	500	700	39 ma	137				CLASS C. R. F. POWER AMP.
			3000	-200	500	600	36 ma	145				PLATE MOD. R. F. POWER AMP.
5R4GY	5.0	2.0	PEAK INVERSE 2100			250 max.						
5654/6AK5	6.3	0.175	180	$R_{K=180}$	120	7.7		2.4	500,000		5000	
5670	6.3	0.350	150	$R_{K=240}$		8.2			27,000	35	5500	
5686	6.3	0.350	250	-12.5	250	27		5	9,000		3100	
5726/6AL5W	6.3	0.300	PEAK INVERSE 330			54 ma						
5749/6BA6W	6.3	0.300	250	$R_{K=68}$	100	11		4.2	1,000,000		4100	

TABLE 7-5. ELECTRON TUBE CHARACTERISTICS (Cont'd)

JAN TUBE TYPE	FIL. VOLT	FIL. AMP	PLATE VOLT	GRID NEG. VOLT	SCREEN VOLT	PLATE Ma	MAX. GRID DRIVE	SCREEN Ma	PLATE R (ohms)	Mu FACTOR	TRANS-CONDUCT-ANCE (u-ohms)	REMARKS
5750/6BE6W	6.3	0.300	250	-1.5	100	2.6	0.5 ma	7.5	1,000,000		475	
5814 A	6.3	0.350	250	-8.5		10.5			7,700	17	2200	
6AG7	6.3	0.650	300	-3	150	30		7	130,000		11,000	
6AS7	6.3	2.5	135	$R_{K=250}$					280	2	7000	
6AU6 WA	6.3	0.300	250	-1.0	150	10.6		4.3	1,000,000		5200	
6C8G	6.3	0.300	250	-4.5		3.2			22,000	36	1600	
6J5	6.3	0.300	250	-8		9.0			7,700	20	2600	
6J6	6.3	0.450	300	$R_{K=50}$		8.5	8.0 V		7,100	38	5300	
6L6GA	6.3	0.900	250	-14	250	72		5	22,500		6,000	
6SH7	6.3	0.300	250	-1.0	150	10.8		4.1	900,000		4900	
6SJ7 WGT	6.3	0.300	250	-3	100	3		0.8	1,000,000		1650	
6SL7 WGT	6.3	0.300	250	-2		2.3		44,000		70	1600	
6SN7 WGT	6.3	0.600	250	-8		9			7,700	20	2600	
6V6 GT	6.3	0.450	250	-15	250	70	12.5V	5	60,000		3750	
6X4W	6.3	0.600	PEAK INVERSE 1,250			70						
6X5 WGT	6.3	0.600	PEAK INVERSE 1,250			70						
807	6.3	0.900	500	-45	250	100	3.5	5				

NOTE: R_K = CATHODE BIAS RESISTOR

TABLE 7-6. COIL WINDING DATA

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
L-101 L-103	1	CNA Type R-50PT-3	Layer, three pi	36 AWG	720	40		---	10 mh, 75 ma
L-102 L-302 L-801 L-812 L-901 L-902 L-1108 L-1116	2	CNA Type R-50PT-4	Layer, four pi	36 AWG	904	30		---	2.5 mh, 75 ma
L-301	3	CBIK No. 4095	Single winding layer wound	34 PE	1500	97		1200	725 mh
L-501	4	CBIK No. 3953	One winding	17 AWG	1040	8.5		10000	2H at 2A
L-502 L-503	4	CBIK No. 3933	One winding	23 AWG	1520	25		2000	4H at 0.6A
L-504 L-505	4	CBIK No. 3931	One winding	25 AWG	1770	40		2500	4H at 0.5A
L-601	4	CBIK No. 3956	One winding	30 AWG	1660	60		2500	2H at 150 ma
L-804 L-903 L-904	5	CBIK No. 4103	Single layer	35 AWG	145	---		---	34 mh
L-815	6	CBIK No. 3766	Single winding, five pi	40 AWG	380 per pi	---		---	
L-816 L-817	7	CBIK No. 3765	Single winding, three pi	40 AWG	420 per pi	---		---	200 Kc w/59 uuf
L-818 L-819	8	CNA type R-33-05A 3003	Single winding, two pi	---	188	5.5		---	0.1 uh, 75 ma
L-1101	9	CBIK No. 3773-1	Single layer	30 AWG	50	---		---	
L-1102	9	CBIK No. 3773-2	Single layer	28 AWG	21	---		---	
L-1103	9	CBIK No. 3773-3	Single layer	28 AWG	30	---		---	

TABLE 7-6. COIL WINDING DATA (Cont'd)

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
L-1105	9	CBIK No. 3773-4	Single layer	28 AWG	22	---		---	
L-1106	9	CBIK No. 3773-5	Single layer	22 AWG	7	---		---	
L-1107	9	CBIK No. 3773-6	Single layer	28 AWG	12	---		---	
L-1110	9	CBIK No. 3788-1	Single layer	22 AWG	30	---		---	
L-1111	9	CBIK No. 3788-2	Single layer	22 AWG	19	---		---	
L-1112	9	CBIK No. 3788-3	Single layer	14 AWG	8-1/2	---		---	
L-1113	9	CBIK No. 3788-4	Single layer	12 AWG	4-1/2	---		---	
L-1114	9	CBIK No. 3788-5	Single layer	12 AWG	3-1/2	---		---	
L-1115 L-1301 L-1311	9	COM No. Z-14	Single layer	33 AWG	123	2.91		---	44 uh, 7 to 35 Mc at 600 ma
L-1104 L-1109 L-1117 L-1118 L-1120	10	CBIK No. 4337	Single layer	20 AWG	4	---		---	L-1104 wound on R1106 L-1109 wound on R1120 L-1117 wound on R1130 L-1118 wound on R1131 L-1120 wound on R1183
L-1119	11	CBIK No. 4324	Single layer	18 AWG	3-1/2	---		---	
L-1302	12	CBIK No. 3808	Single layer	3/16-in. cu tube	4-1/2	---		---	Has tap at two turns
L-1303	13	CBIK No. 3801	Single layer	14 AWG	13	---		---	
L-1304	14	CBIK No. 3803	Single layer	16 AWG	29	---		---	
L-1305	15	CBIK No. 3809	Single layer	34 AWG	256	---		---	
L-1306 L-1307	16	CBIK No. 4100	Single layer	18 AWG	3/4	---		---	L-1306 wound on R-1301 L-1307 wound on R-1302
L-1308 L-1310	17	CBIK No. 4101	Single layer	10 AWG	1	---		---	L-1308 wound on R-1324 L-1310 wound on R-1323

TABLE 7-6. COIL WINDING DATA (Cont'd)

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
L-1309	18	CBIK No. 3806	Single layer	10 AWG	1-1/2	---		---	
L-1312	19	CBIK No. 3847	Single layer	3/8-in. cu tube	6	---		---	Has three taps at: one, two, four turns.
L-1313	20	CBIK No. 3647	Single layer	5/16-in.	10-1/2	---		---	Has three taps at: 3-3/4, 5-1/2, and 7-1/2 turns.
L-1314	21	CBIK No. 3812	Single layer	5/8-in. cu tube	2-3/4	---		---	Has two taps at: 9/10, and 1-4/5 turns.
L-1401	22	CBIK No. 3860	Single layer	5/16-in. cu tube	13	---		---	Has two taps at: three and five turns.
L-1402	23	CBIK No. 3866	Single layer	3/8-in. cu tube	6-1/2	---		---	Has three taps at: two, four and five turns.
L-1403	24	CBIK No. 3844	Single layer	5/8-in. cu tube	3	---		---	Has two taps at: 3/4 and 1-1/2 turns.
T-106	25	CAI No. 41-466	Pri one pi	38 AWG	100	8.7		---	Top and bottom adj.
T-107			Sec one pi	38 AWG	100	8.7		---	875-900 Kc
T-108	25	CAI No. 41-467	Pri one pi	38 AWG	100	8.3		---	Top and bottom adj.
T-109			Sec one pi	38 AWG	100	8.3		---	800 Kc
T-111	26	CAI No. 41-468	Three windings						No. two coil tap at
			No. one-1 pi	36 AWG	500	30.0		---	150 turns. 100 Kc
			No. two-1 pi	36 AWG	300	17.5		---	IF transformer
			No. three-1 pi	36 AWG	150	8.1		---	
T-113	27	CAI No. 41-470	Two windings						
			Inner-single layer	30 AWG	45	0.8		---	2.0 - 4.5 Mc
			Outer-single layer	30 AWG	6	0.15		---	
T-301	28	CBIK No. 4088	Three windings						
T-401			Pri No. one	34 AWG	616	43.10		500	Range: 100-5000 cps,
			Pri No. two	34 AWG	230	8.52		500	p/m 1 db
			Sec	40 AWG	5520	1476		500	

TABLE 7-6. COIL WINDING DATA (Cont'd)

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
T-302	29	CBIK No. 4089	Three windings						Range: 100-5000 cps,
			Pri No. one	40 AWG	4000	1200		1000	p/m 1 db
			Pri No. two	40 AWG	4000	1375	1:1	1000	
			Sec	40 AWG	4000	1550	1:1	1000	
T-303	30	CBIK No. 3932	Pri	39 AWG	3900	1094	---	1000	0.2 Watt audio level.
			Sec	42 AWG	7800	2324	1:4	1000	Range: 100-5000 cps, p/m 1 db
T-304	31	CBIK No. 3920	Pri	36 AWG	2600	343	---	1000	2 Watt audio level.
			Sec	36 AWG	2600	424	---	1000	Range: 150-4000 cps, p/m 1 db
T-305	32	CBIK No. 4096	Pri	29 AWG	1270	40.51	---	1000	Pri. 210/220/230V,
			Sec	2X19 AWG	38	0.089	---	1000	50/60 cps, Sec. 6.3V ct, 5A
T-306	33	CBIK No. 3929	Pri	17 AWG	290	1.324	---	1000	Pri. 210/220/230V, 50/60 cps.
			Sec No. one	8 SQ	10	0.023	---	2500	Sec No. one 7.5 V ct, 21A
			Sec No. two	8 SQ	10	0.017	---	2500	Sec No. two 7.5 V ct, 21A
T-402	34	CBIK No. 4090	Pri	36 AWG	3680	498	---	1500	3.5 Watt audio level
			Sec	32 AWG	950	64	15:1	500	Range: 100-5000 cps, p/m 1 db
T-403	35	CBIK No. 3936	Pri	23 AWG	342	3.602	---	1000	Pri. 105/110/115V, 50/60 cps
			Sec No. one	33 AWG	1900	260.9	---	2500	Sec No. one, 600 V at .06A, ct
			Sec No. two	19 AWG	20	0.129	---	2500	Sec No. two, 6.3V at 2A, ct
			Sec No. three	17 AWG	16	0.072	---	2500	Sec No. three, 5.0V at 3A, ct
T-501 T-502	36	CBIK No. 4091	Pri	21 AWG	360	3.91	---	1000	Pri. 210/220/230V, 50/60 cps
			Sec No. one	2 No. 14	8	0.026	---	7000	Sec No. one, 5V at 10A
			Sec No. two	2 No. 14	8	0.024	---	7000	Sec No. two, 5V at 10A
			Sec No. three	2 No. 14	8	0.026	---	7000	Sec No. three, 5V at 10A

TABLE 7-6. COIL WINDING DATA (Cont'd)

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
T-504	37	CBIK No. 4092	Pri	20 AWG	368	3.653	---	1000	Pri. 210, 220/230 V, 50/60 cps
			Sec No. one	20 AWG	193	1.761	---	1000	Sec No. one. 115 V at 1A
			Sec No. two	20 AWG	118	1.167	---	1000	Sec No. two, 70 V at 1A
T-505	38	CBIK No. 3954	Pri	13 AWG	138	0.379	---	1000	Pri, 200/210/220/230V, 50/60 cps
			Sec No. one	22 AWG	800	11.13	---	2500	Sec No. one, 1310V at 0.3A
			Sec No. two	20 AWG	780	15.95	---	2500	Sec No. two, 1280V at 0.9A
T-506	39	CBIK No. 3955	Pri	18 AWG	260	1.796	---	1000	Pri, 210/220/230V 50/60 cps
			Sec No. one	24 AWG	1080	25.75	---	2000	Sec No. one, 900 V at 0.5 A, ct
			Sec No. two	2 No. 17	6	0.023	---	2000	Sec No. two, 5.0 V at 6.0A, ct
T-507	40	CBIK No. 4093	Pri	28 AWG	836	27.5	---	1000	Pri. 200/210/220/230V, 50/60 cps
			Sec No. one	13 AWG	10	0.017	---	2500	Sec No. one, 2.5V at 10A, ct
			Sec No. two	13 AWG	10	0.018	---	2500	Sec No. two, 2.5 V at 10A ct
T-508	41	CBIK No. 4094	Pri	28 AWG	800	25.62	---	1000	Pri. 200/210/220V, 50/60 cps
			Sec No. one	15 AWG	25	0.02	---	2500	Sec No. one, 6.3V at 1.0A, ct
			Sec No. two	15 AWG	25	0.057	---	2500	Sec No. two, 6.3V at 5.5A, ct
T-509 T-510	42	CBIK No. 4099	Auto trans.	17 2x10SQHF	396 36	1.6		1000	Adj. 200/210/220/230/ 240 V, 50/60 cps, three phase, 23A, 0.85 PF; 36 turns between term. 2 and 4
T-801	43	CBIK No. 3771-1	Two windings No. one No. two	 32 AWG 32 AWG	 46 8	 0.9 0.9		---	Tap at 23 turns. Both windings adj.

TABLE 7-6. COIL WINDING DATA (Cont'd)

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
T-802	44	CBIK No. 3776	Three windings						
			No. one	32 AWG	10	0.1		---	No. one winding adj. slug, top 2.0-4.2 Mc.
			No. two	32 AWG	46	1.0		---	
			No. three	34 AWG	58	---		---	No. three winding is 103 uh
T-803	45	CBIK No. 3767	Two windings						
			No. one, 1 pi	41 AWG	225	17		---	No. one winding adj. slug, top, 200 Kc
			No. two, 2 pi	41 AWG	225	40		---	
T-901	46	CBIK No. 4097	Pri	29 AWG	1270	43.95	---	1000	Pri, 210/220/230/V, 50/60 cps
			Sec.	19 AWG	76	0.35	---	1600	Sec. 12.6 V at 2.5A, ct
T-902	47	CBIK No. 3857	Two windings						
			No. one. 1 pi	30 AWG	80	1.2		---	No. one slug adj. at top
			No. two, 1 pi	30 AWG	17	0.2		---	
T-1001	48	CBIK No. 3937	Pri	21 AWG	443	4.01	---	1000	Pri, 210/220/230V, 50/60 cps
			Sec No. one	24 AWG	13	0.31	---	2500	Sec No. one, 6.3V at 0.6A
			Sec No. two	18 AWG	10	0.04	---	2500	Sec No. two, 5V at 4A
			Sec No. three	2x15 AWG	13	0.029	---	2500	Sec No. three, 6.3V at 10A
			Sec No. four	2x15 AWG	13	0.03	---	2500	Sec No. four, 6.3V at 9A
			Sec No. five	2x20 AWG	13	0.068	---	2500	Sec No. five, 6.3V at 3A
T-1002	49	CBIK No. 3935	Pri	18 AWG	280	1.86	---	1000	Pri, 200/210/220/ 230 V, 50/60 cps
			Sec No. one	22 AWG	870	12.53	---	1680	Sec No. one, 680 V at 450 ma, ct
			Sec No. two	2x23 AWG	23	0.296	---	1500	Sec No. two, 18 V at 1.2A
T-1101	50	CBIK No. 3934	Pri	28 AWG	836	26.87	---	1000	Pri, 210/220/230 V, 50/60 cps
			Sec	14 AWG	24	0.052	---	1000	Sec. 6.0V at 7.0A, ct

TABLE 7-6. COIL WINDING DATA (Cont'd)

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
T-1102	51	CBIK No. 3938	Pri	28 AWG	836	27.06	---	1000	Pri, 210/220/230 V, 50/60 cps
			Sec No. one	18 AWG	25	0.108	---	500	Sec No. one, 6.3V at 3.0A, ct
			Sec No. two	18 AWG	25	0.114	---	500	Sec No. two, 6.3V at 3.0A, ct
T-1301	33	CBIK No. 3929	Pri	17 AWG	290	1.324	---	1000	Pri, 210/220/230 V, 50/60 cps
			Sec No. one	8 SQ	10	0.023	---	2500	Sec No. one, 7.5V at 21A, ct
			Sec No. two	8 SQ	10	0.017	---	2500	Sec No. two, 7.5V at 21A, ct
T-1501	52	CBIK No. 4132	Pri	23 SF	3200	119	---	12000	Pri, 0525A DC per side, ct
			Sec No. one	23 SF	302	12.97	---	1500	Sec No. one, tap at 3650 ohm, 1A DC
			Sec No. two	19 SF	2420	33.66	---	1500	Sec No. two, two taps, one at 75% and one at 60%, 0.5A DC 2KW audio level Range: 150 to 3500 cps, p/m 1 db.
T-1603	53	CBIK No. 4098	Pri	7 AWG	102	---	---	1000	Pri, 210/220/230 V, 50/60 cps, three phase
			Sec No. one Sec No. two Sec No. three	16 AWG	825	---	---	9000	Sec No. one, two and three wye connected, 1840V at 1.632A
Z-103	54	CAI No. 37-262	Two windings, four pi each	36 AWG 36 AWG	220 220	100 100		---	75-100 Kc, 2.5 mh
Z-104	55	CBIK No. 3970	Single winding, single layer	30 AWG	75	---	---	---	2.0-4.5 Mc, Iron core adj.
Z-105 Z-106	55	CBIK Nos. 3970 4304	Single winding, single layer	26 AWG	11	---	---	---	10.0-22.5 Mc, Iron core adj. Z-106 contains R-137, C-119 and is CBIK No. 4304.

TABLE 7-6. COIL WINDING DATA (Cont'd)

REF. SYMBOL	DIAGRAM	MFG'R NUMBER	WINDING	WIRE SIZE	TURNS	OHMS DC	IMPED-ANCE RATIO	HI-POT AC VOLTS	REMARKS
Z-107		CBIK No. 4305							Z-107 contains R-129, C-129, C-236 and is CBIK No. 4305. All coils are the same.
Z-112	56	CAI No. 41-469	Two one pi windings	36 AWG 36 AWG	500 500	29.2 29.2		--- ---	100 Kc. Adj. top and bottom.
Z-801	57	CBIK No. 3771-3	Three windings No. one, single layer No. two, 4 pi No. three, 3 pi	 32 AWG 36 AWG 36 AWG	 46	 30 22		 --- --- ---	 2.0-4.5 Mc, impedance from 25 K to 60K. Includes C-812/15
Z-802	58	CBIK No. 3771-4	Two windings, No. one, single layer No. two, four pi	 32 AWG 36 AWG	 46 ---	 --- 30	 --- ---	 --- ---	 2.0-4.5 Mc. Impedance from 25 K to 60K. Includes R-832, C-817/10
Z-803	59	CBIK No. 4045	Two layer windings						Band pass to 960 cps, 30 db atten above 5000 ohm. Includes R-862, C-863/6.

TABLE 7-6. COIL WINDING DATA (Cont'd)

L-101
L-103



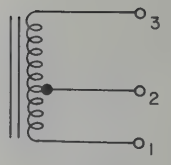
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L-102
L-302
L-801
L-812
L-901
L-902
L-1108
L-1116



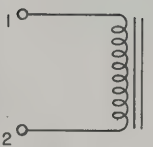
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L-301



3

L-501
L-502
L-503
L-504
L-505
L-601



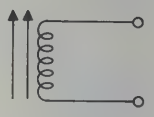
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L-804
L-903
L-904



5

L-815



6

L-816
L-817



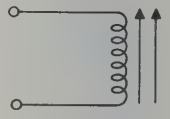
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L-818
L-819



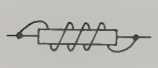
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L-1101 L-1111
L-1102 L-1112
L-1103 L-1113
L-1105 L-1114
L-1106 L-1115
L-1107 L-1301
L-1110 L-1311



9

L-1104
L-1109
L-1117
L-1118
L-1120



10

L-1119

11

L-1302



12

L-1303



13

L-1304



14

L-1305



15

L-1306
L-1307



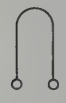
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L-1310



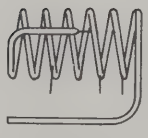
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L-1309



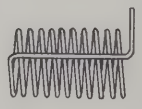
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L-1312



19

L-1313



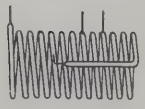
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L-1314



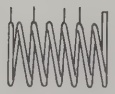
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L-1401



22

L-1402



23

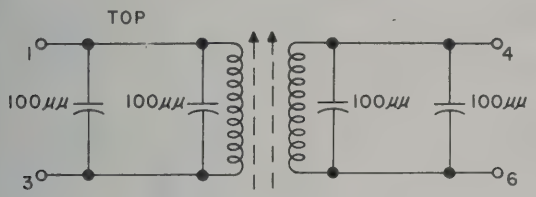
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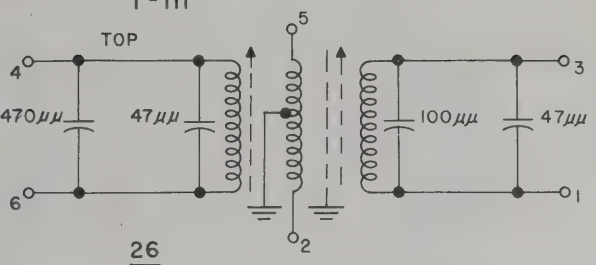
TABLE 7-6. COIL WINDING DATA (Cont'd)

T-106, T-107, T-108, T-109



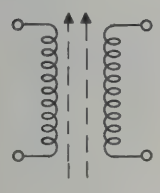
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T-111



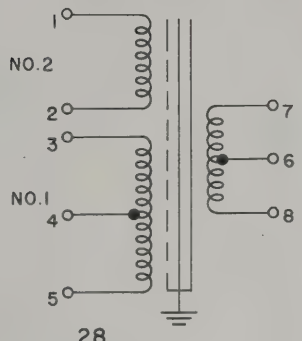
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T-113



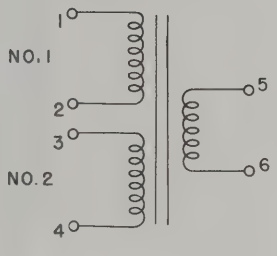
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T-301, T-401



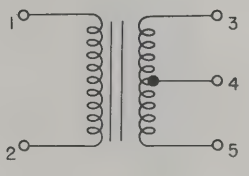
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T-302



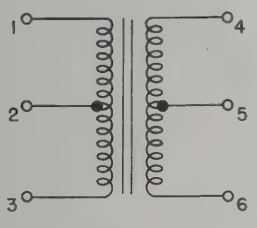
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T-303



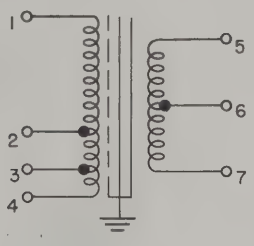
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T-304



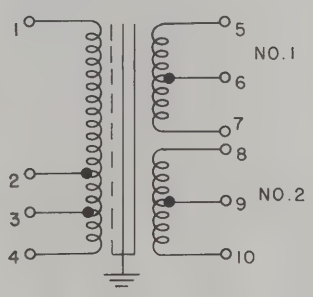
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T-305



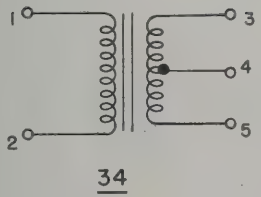
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T-306, T-1301



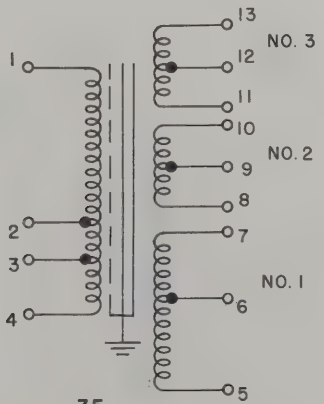
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T-402



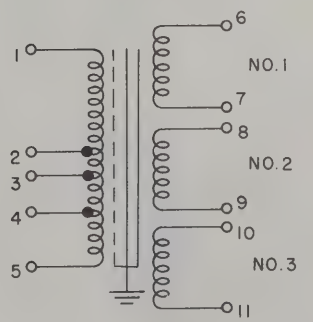
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T-403



35

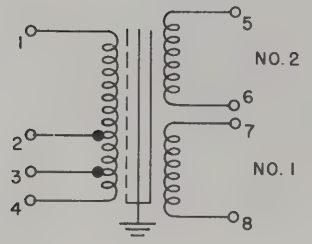
T-501, T-502



36

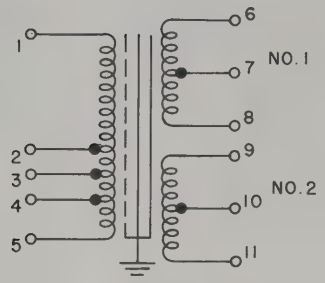
TABLE 7-6. COIL WINDING DATA (Cont'd)

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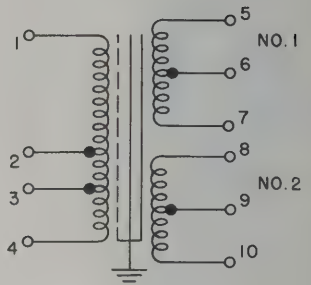
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T-505



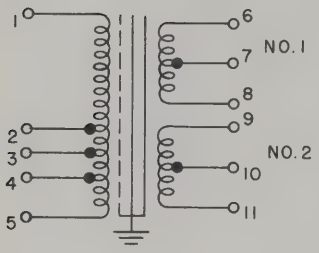
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T-506



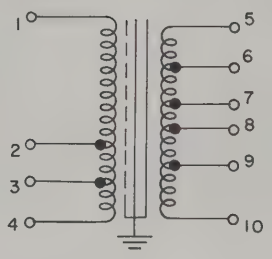
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T-507



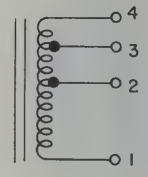
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T-508



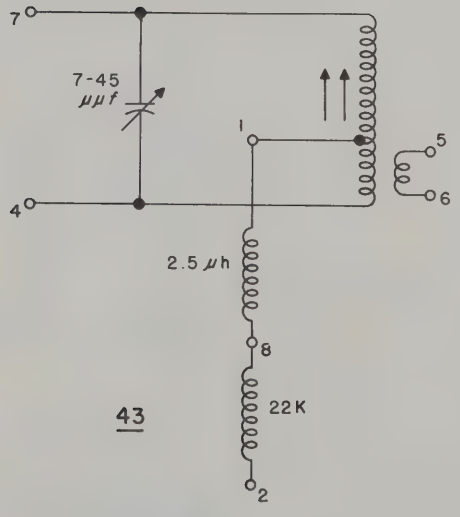
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T-509
T-510



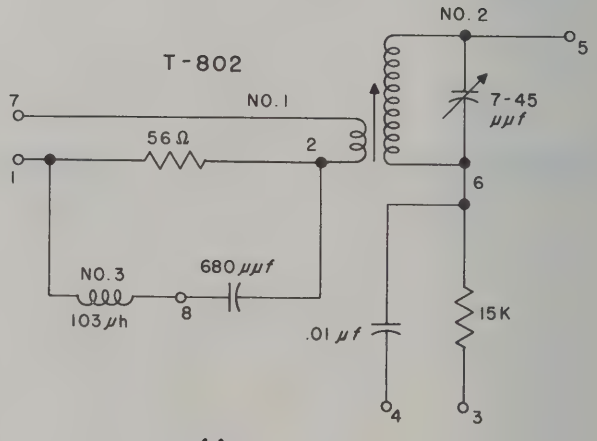
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T-801



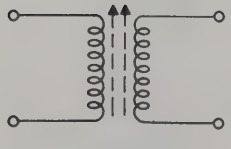
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T-802



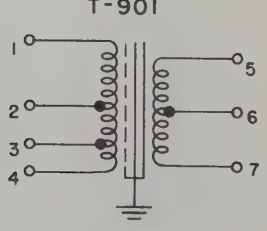
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T-803



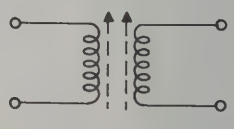
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T-901



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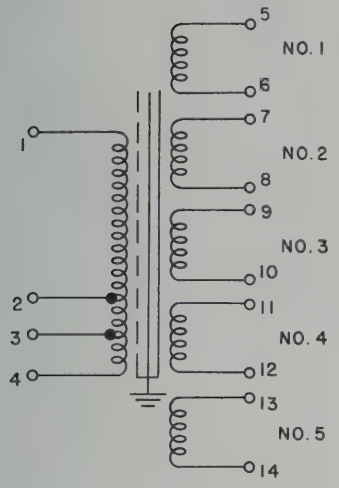
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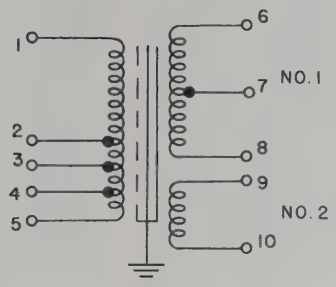
TABLE 7-6. COIL WINDING DATA (Cont'd)

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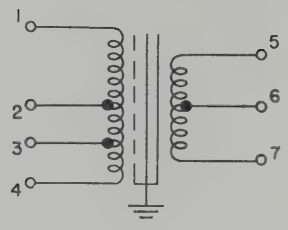
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T-1002



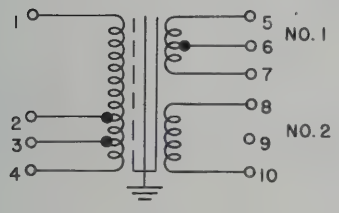
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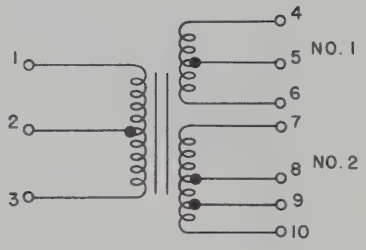
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T-1102



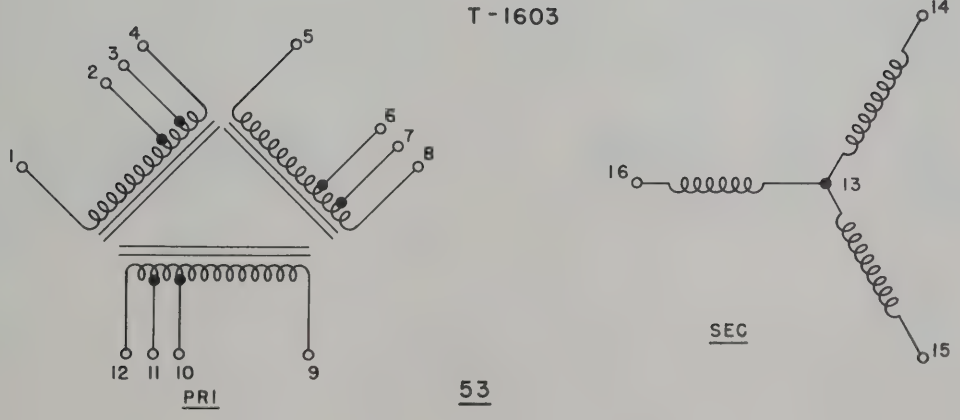
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T-1501



52

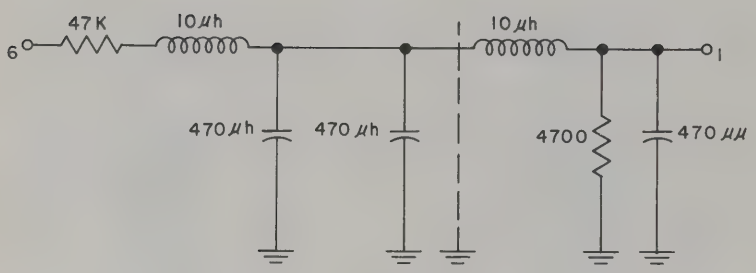
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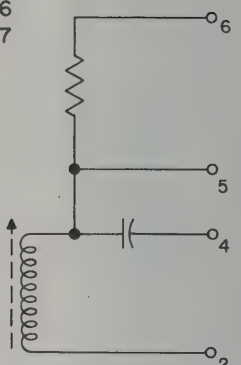
TABLE 7-6. COIL WINDING DATA (Cont'd)

Z-103



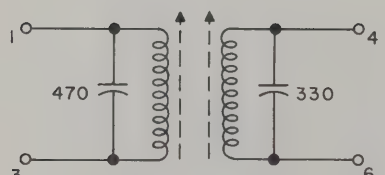
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Z-104
Z-105
Z-106
Z-107



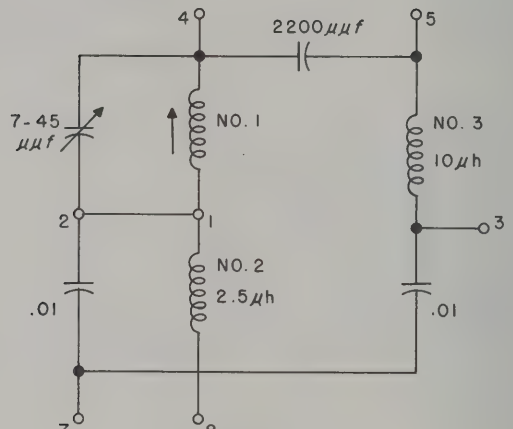
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Z-112



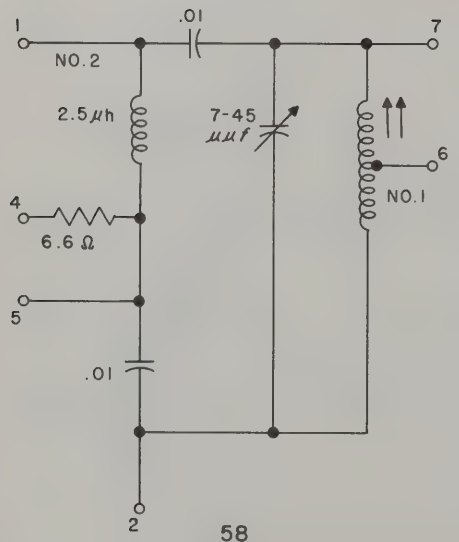
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Z-801



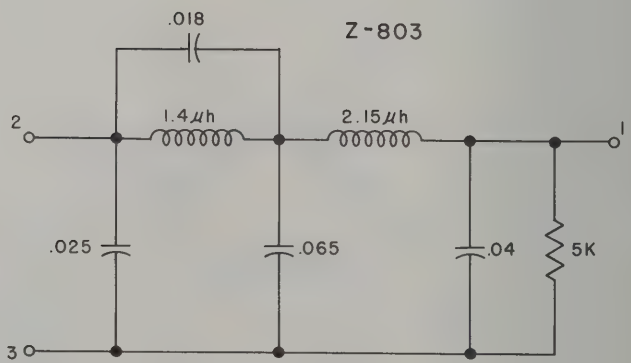
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Z-802



58

Z-803



59

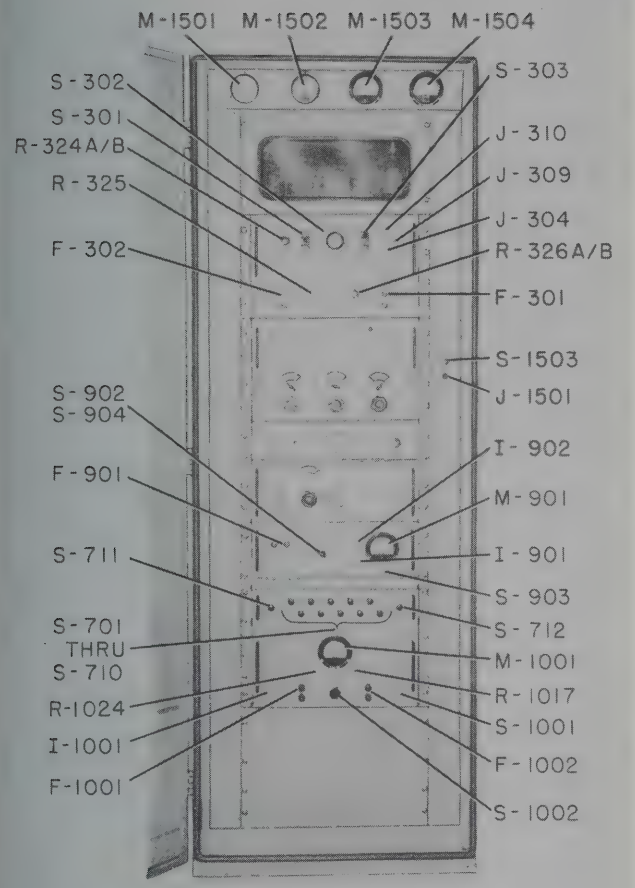


Figure 7-8. Modulator-Oscillator Group OA-745/FRT-15B, Front Parts Arrangement

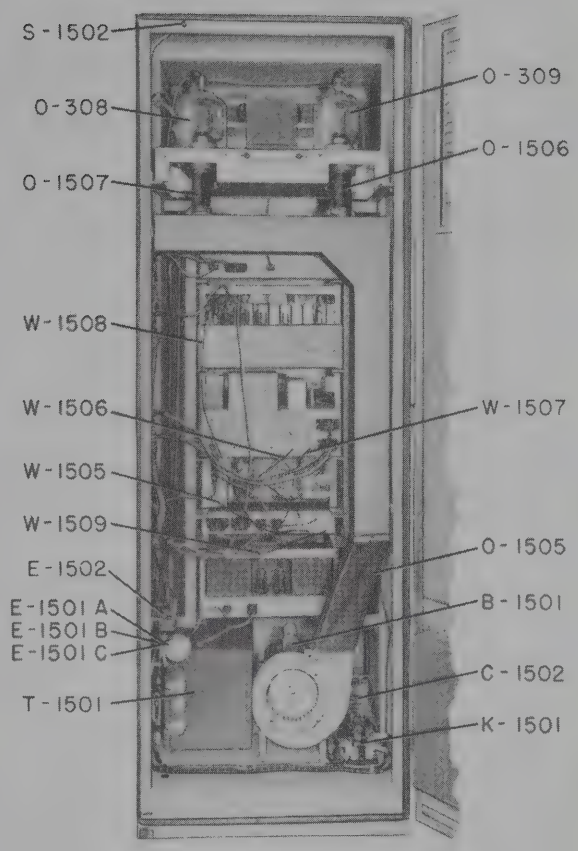


Figure 7-9. Modulator-Oscillator Group OA-745/FRT-15B, Rear Parts Arrangement

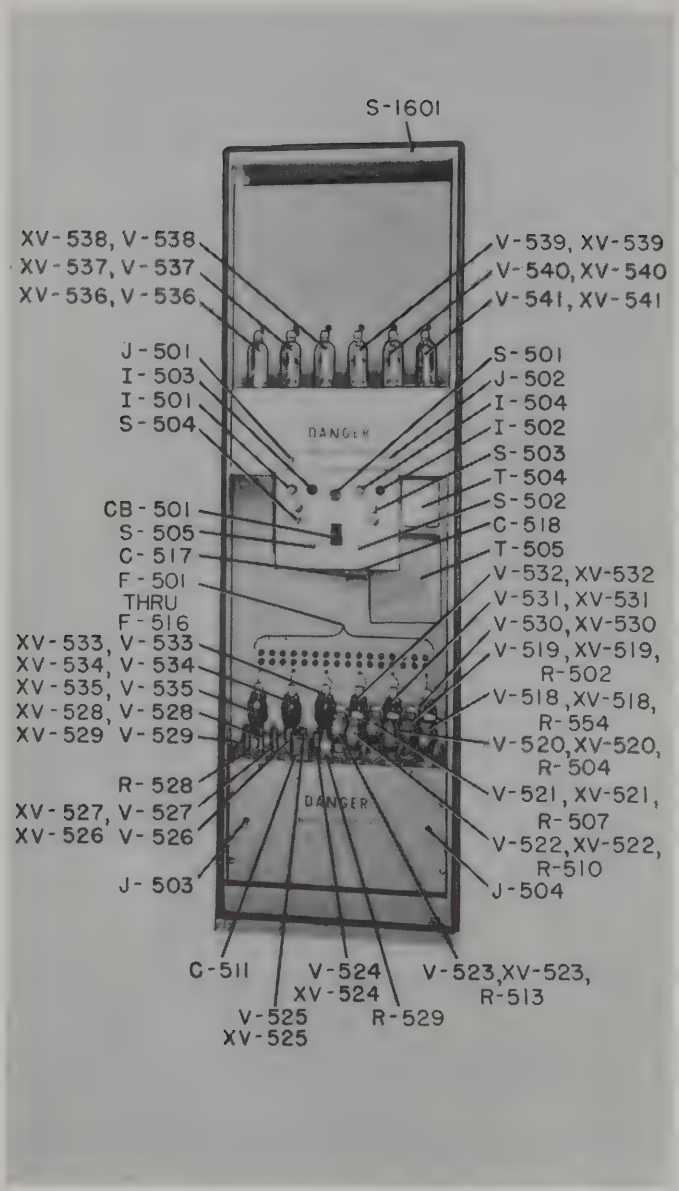


Figure 7-10. Power Supply Assembly PP-1198/FRT-15B, Front Parts Arrangement

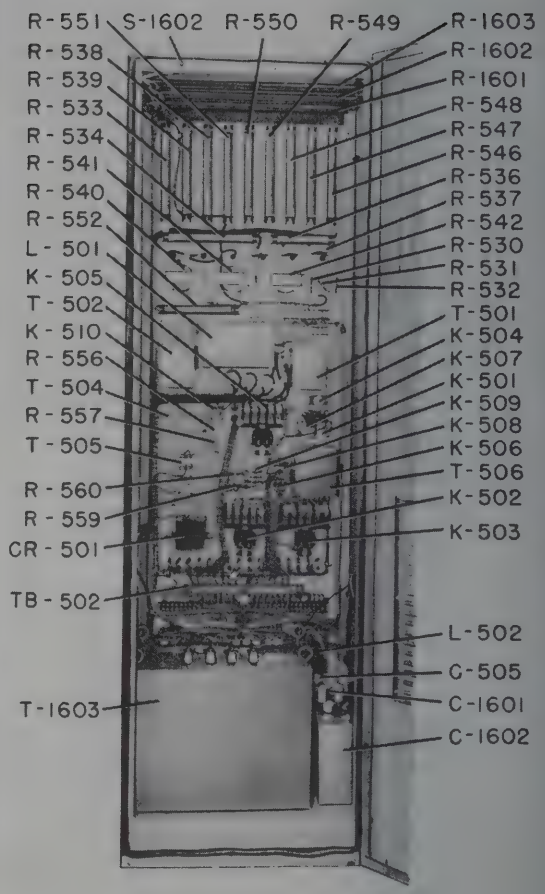


Figure 7-11. Power Supply Assembly PP-1198/FRT-15B, Rear Parts Arrangement

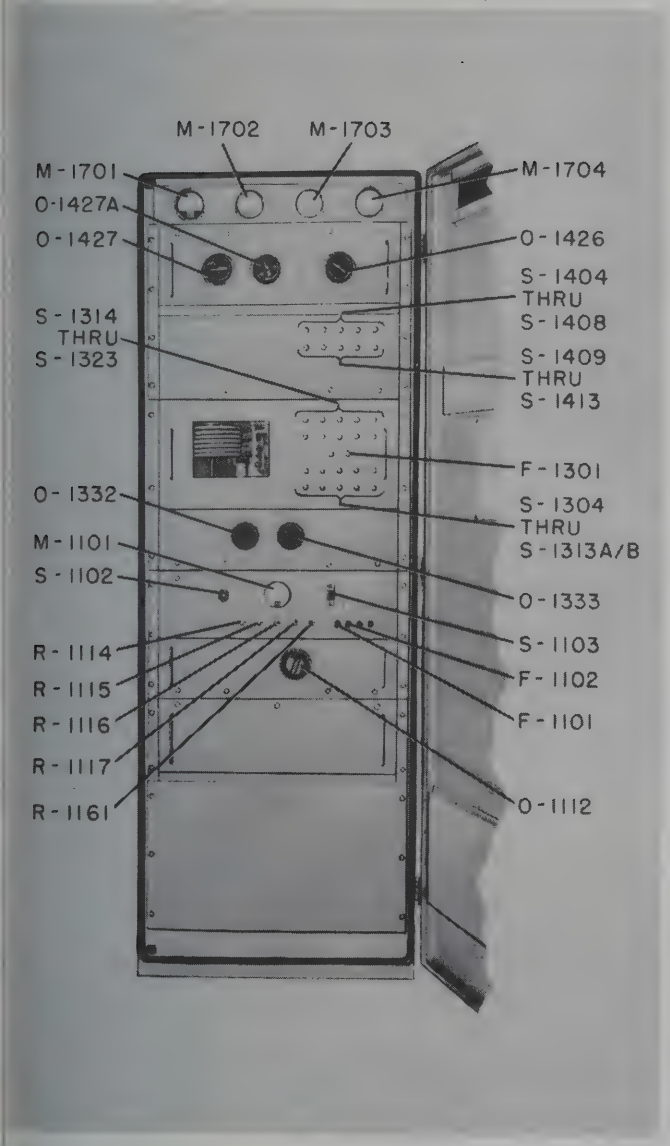


Figure 7-12. Frequency Amplifier AM-1116/FRT-15B, Front Parts Arrangement

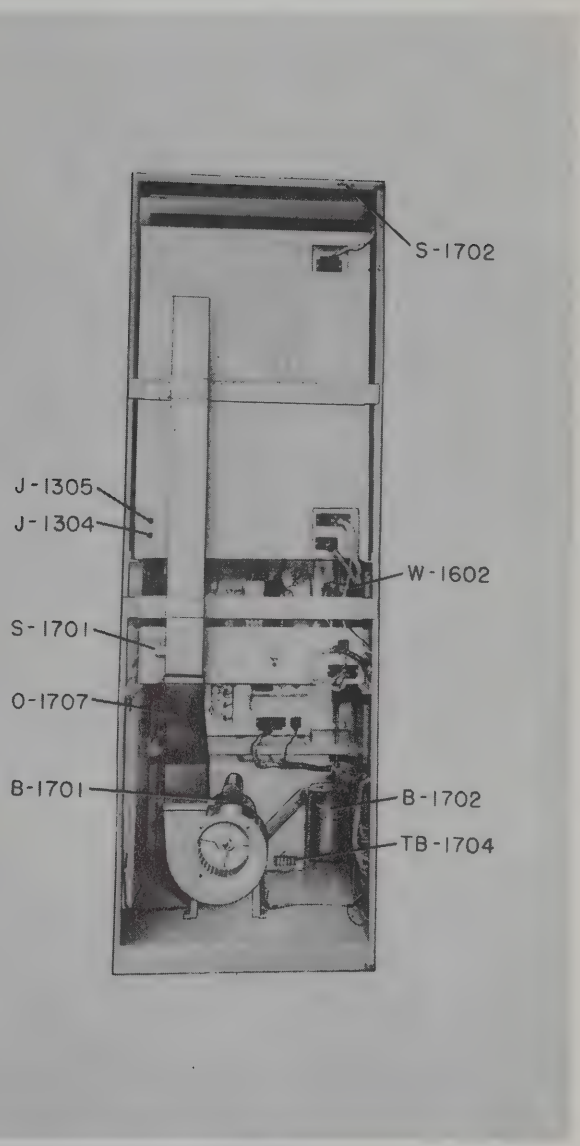


Figure 7-13. Radio Frequency Amplifier AM-1116/FRT-15B, Rear Parts Arrangement

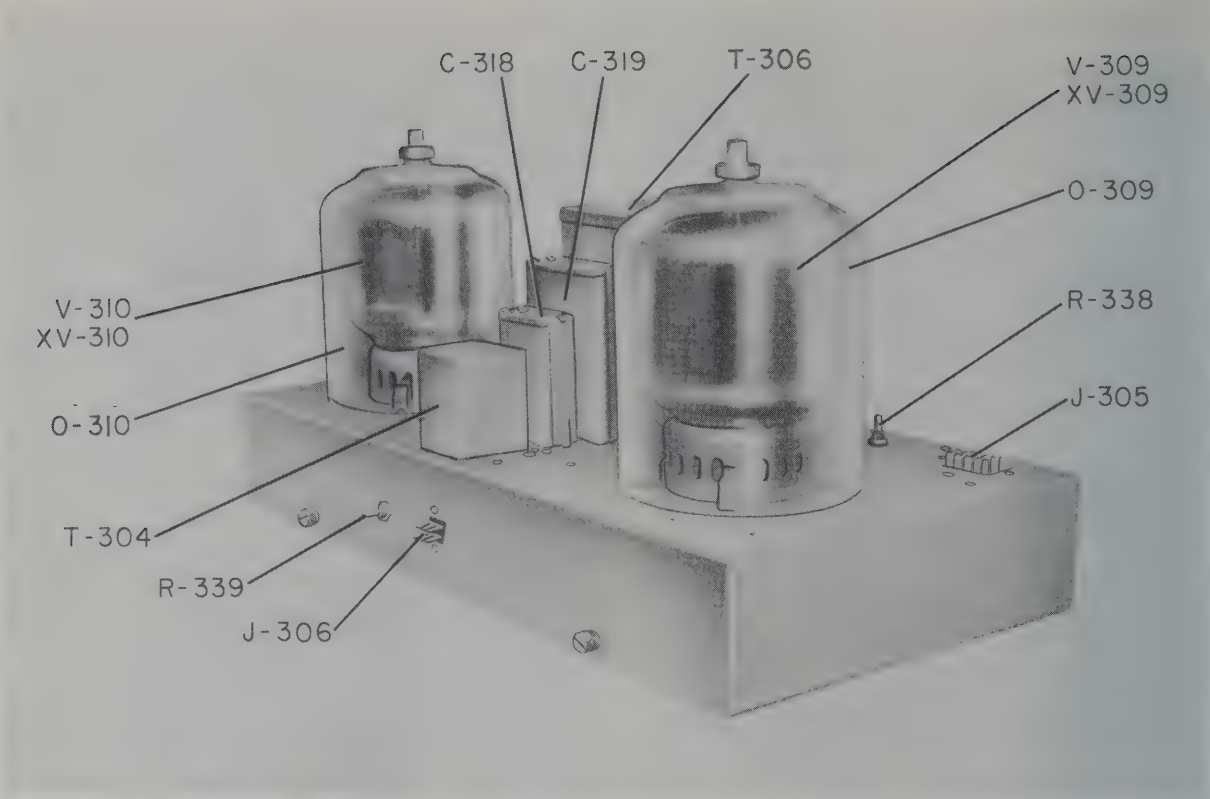


Figure 7-14. Modulator, Top Parts Arrangement

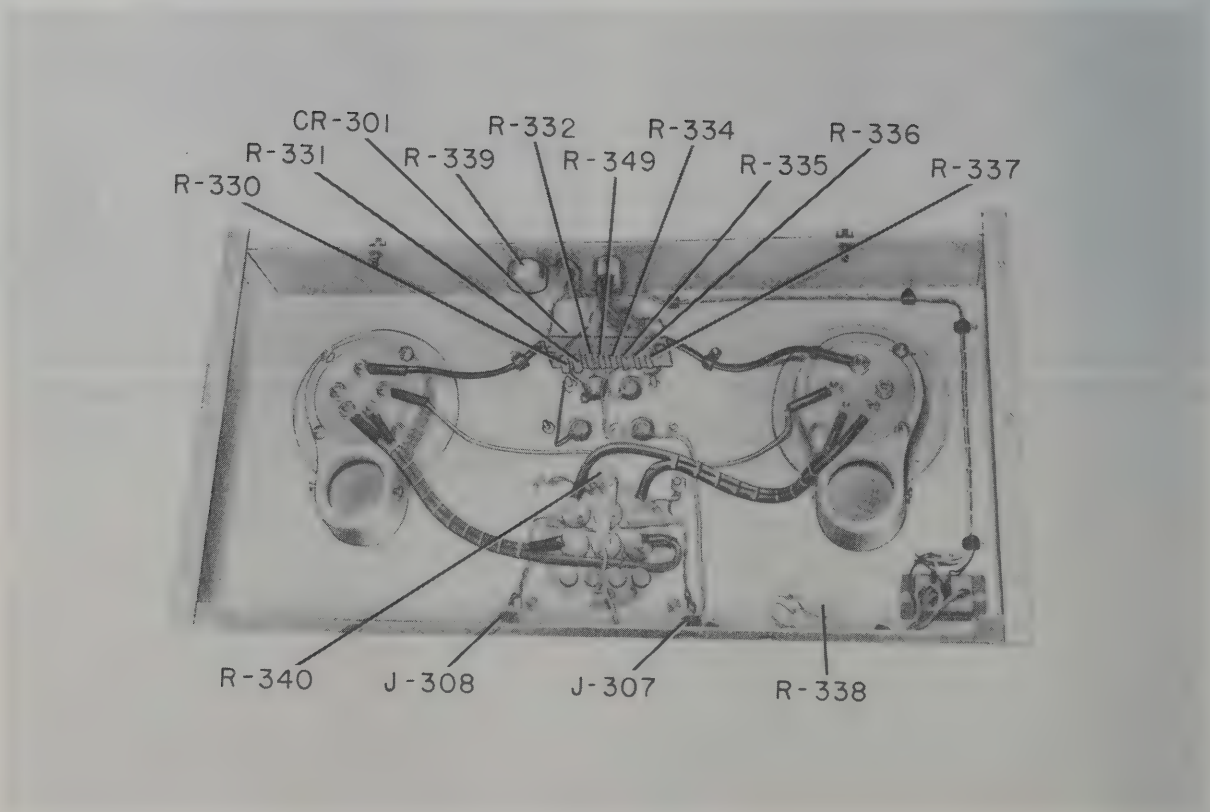


Figure 7-15. Modulator, Bottom Parts Arrangement

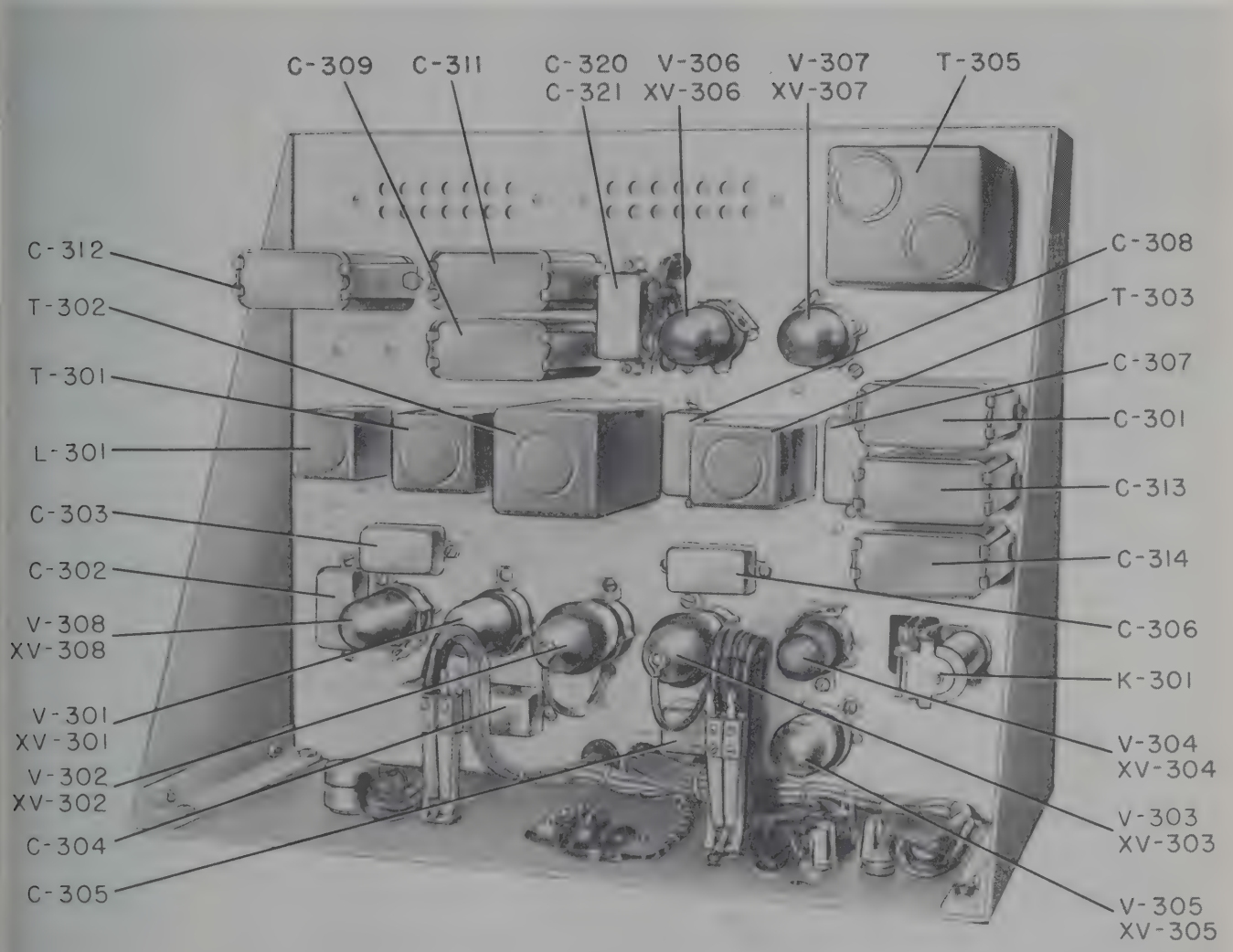


Figure 7-16. Audio Frequency Amplifier AM-1150/FRT-15B, Top Parts Arrangement

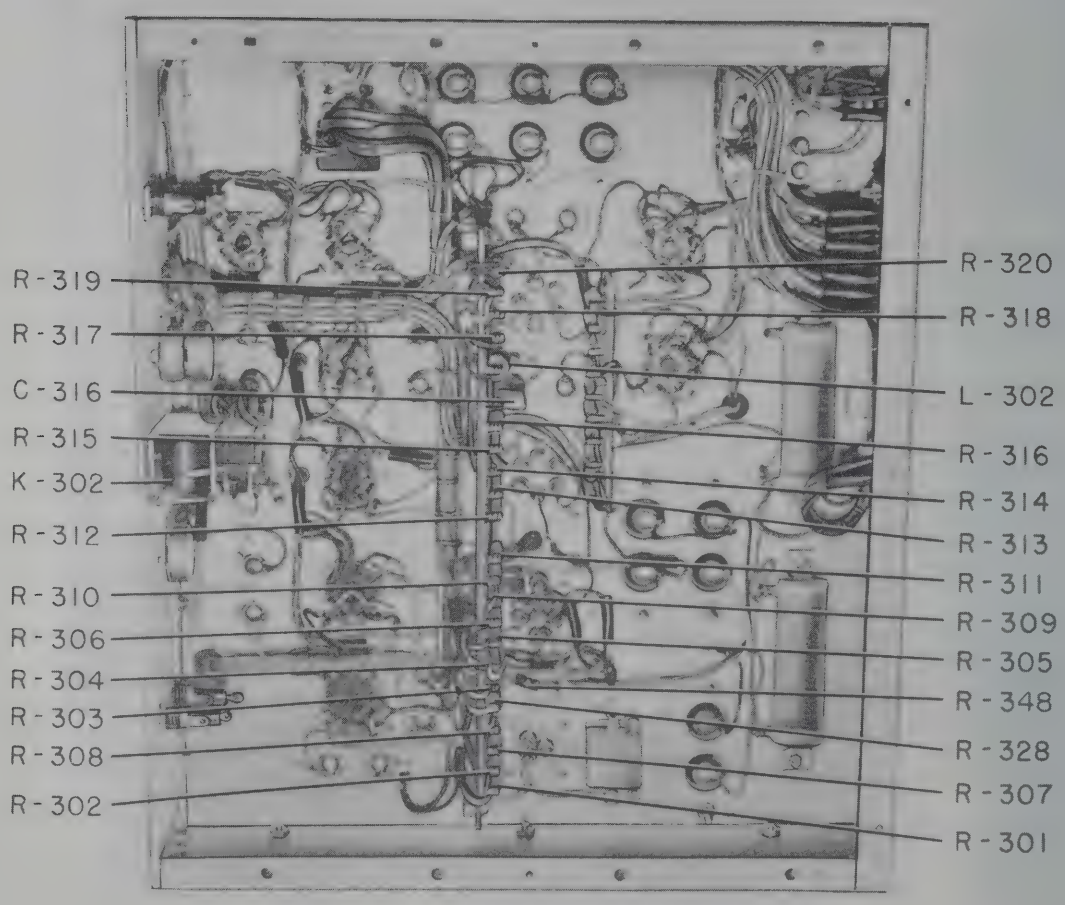


Figure 7-17. Audio Frequency Amplifier AM-1150/FRT-15B
View From Bottom Right, Parts Arrangement

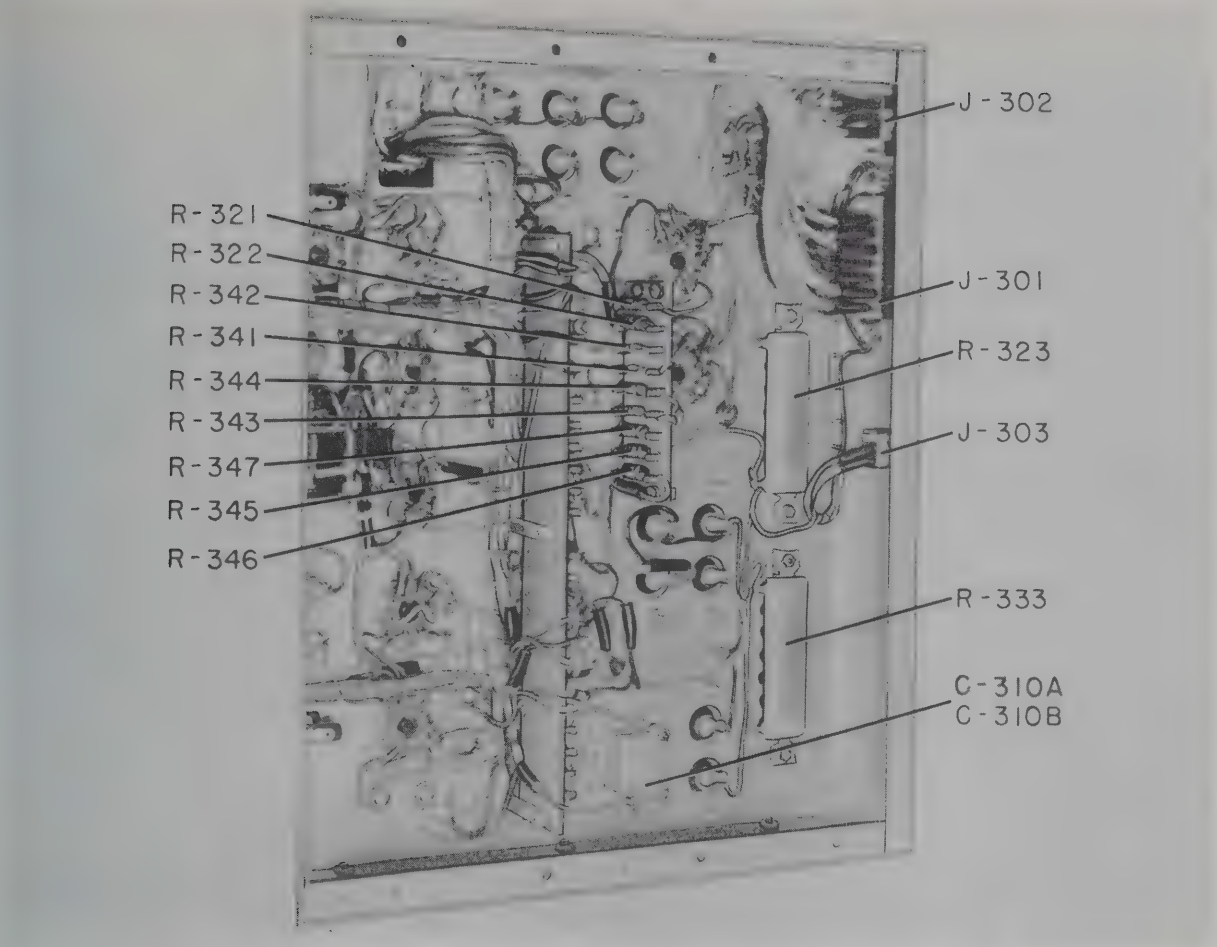


Figure 7-18. Audio Frequency Amplifier AM-1150/FRT-15B, View From Bottom Front, Parts Arrangement

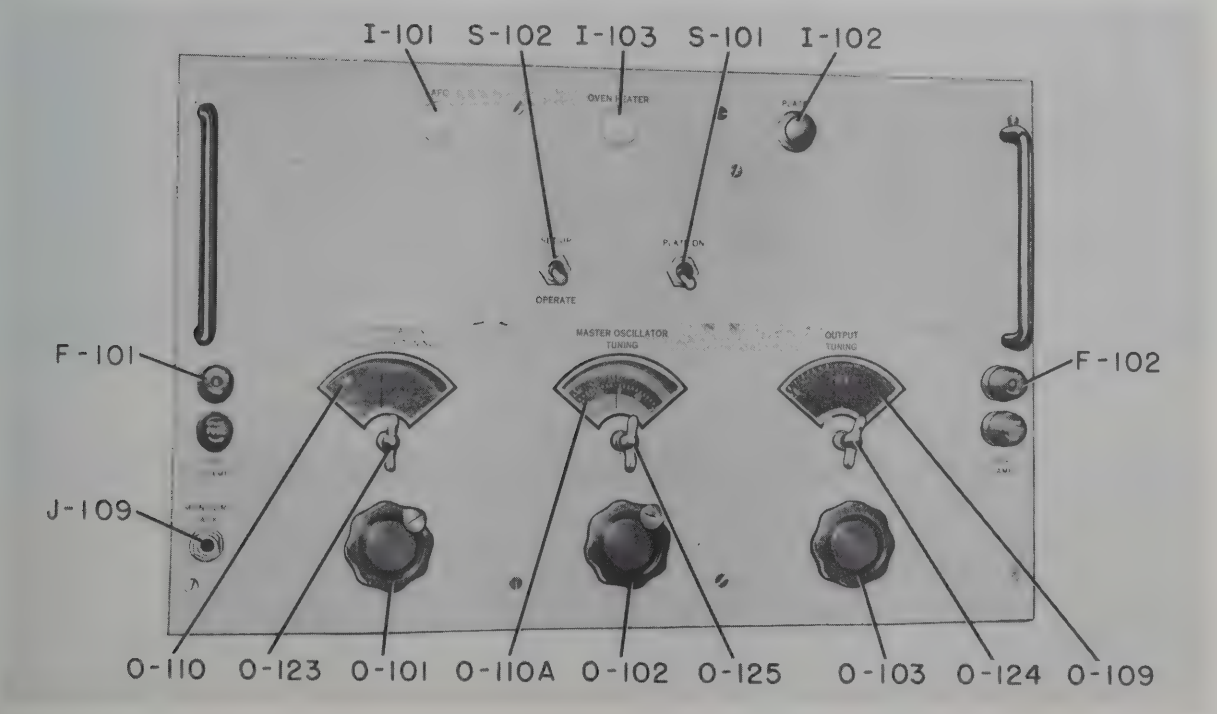


Figure 7-19. Radio Frequency Oscillator 0-317/FRT-15B, Panel Parts Arrangement

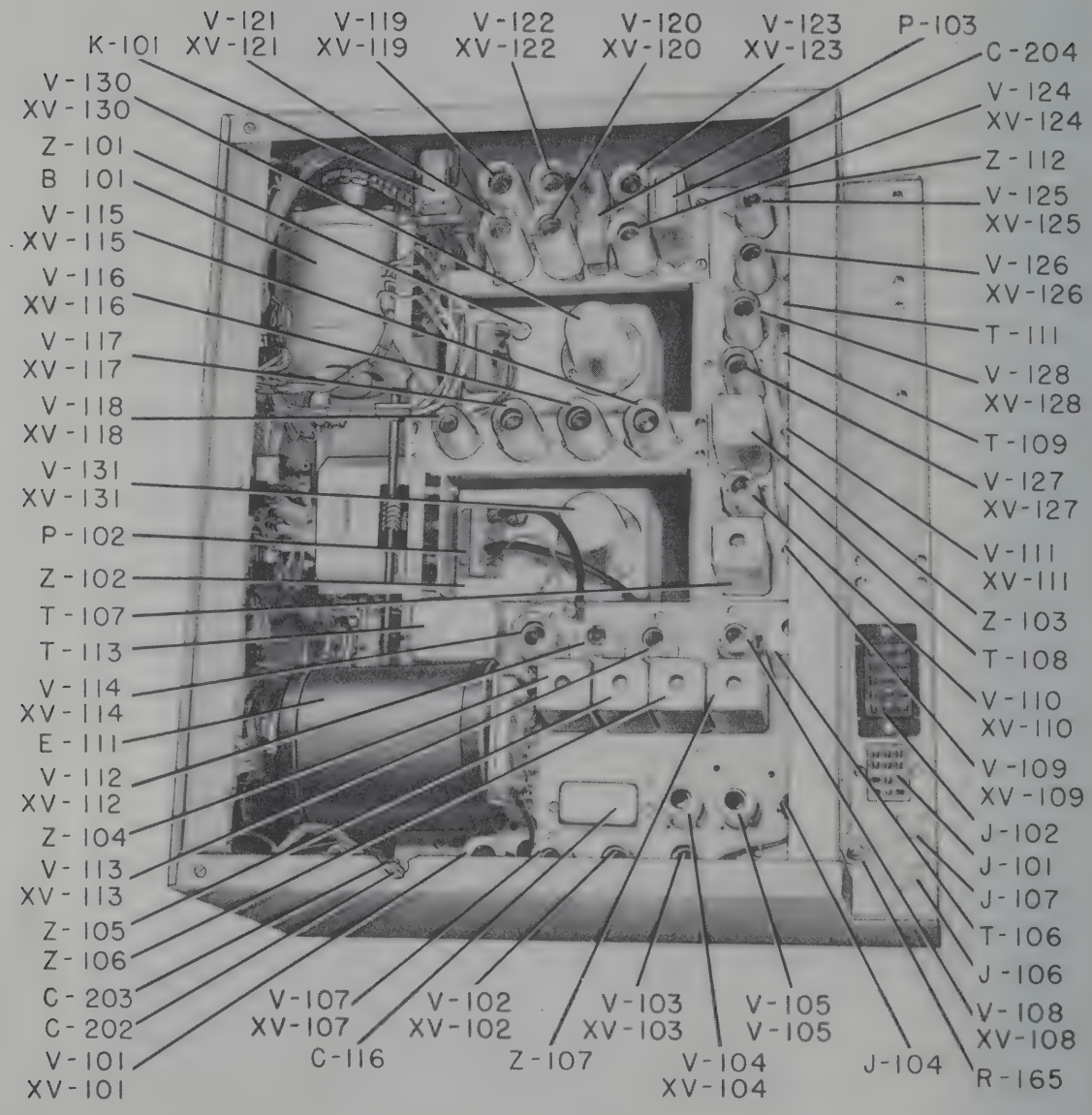


Figure 7-20. Radio Frequency Oscillator 0-317/FRT-15B, Top Parts Arrangement

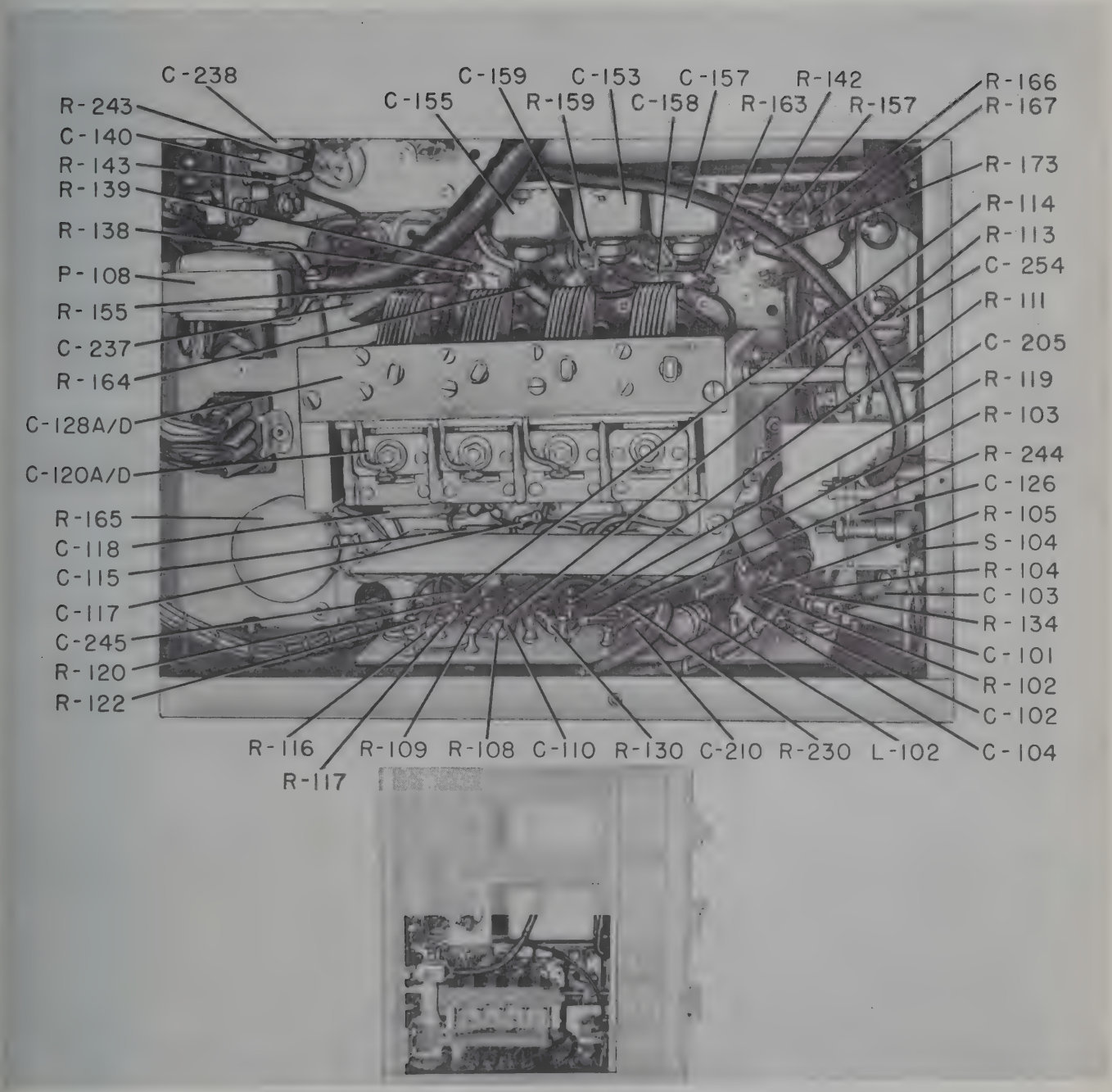


Figure 7-21. Radio Frequency Oscillator 0-317/FRT-15B, View of Bottom Right, Parts Arrangement

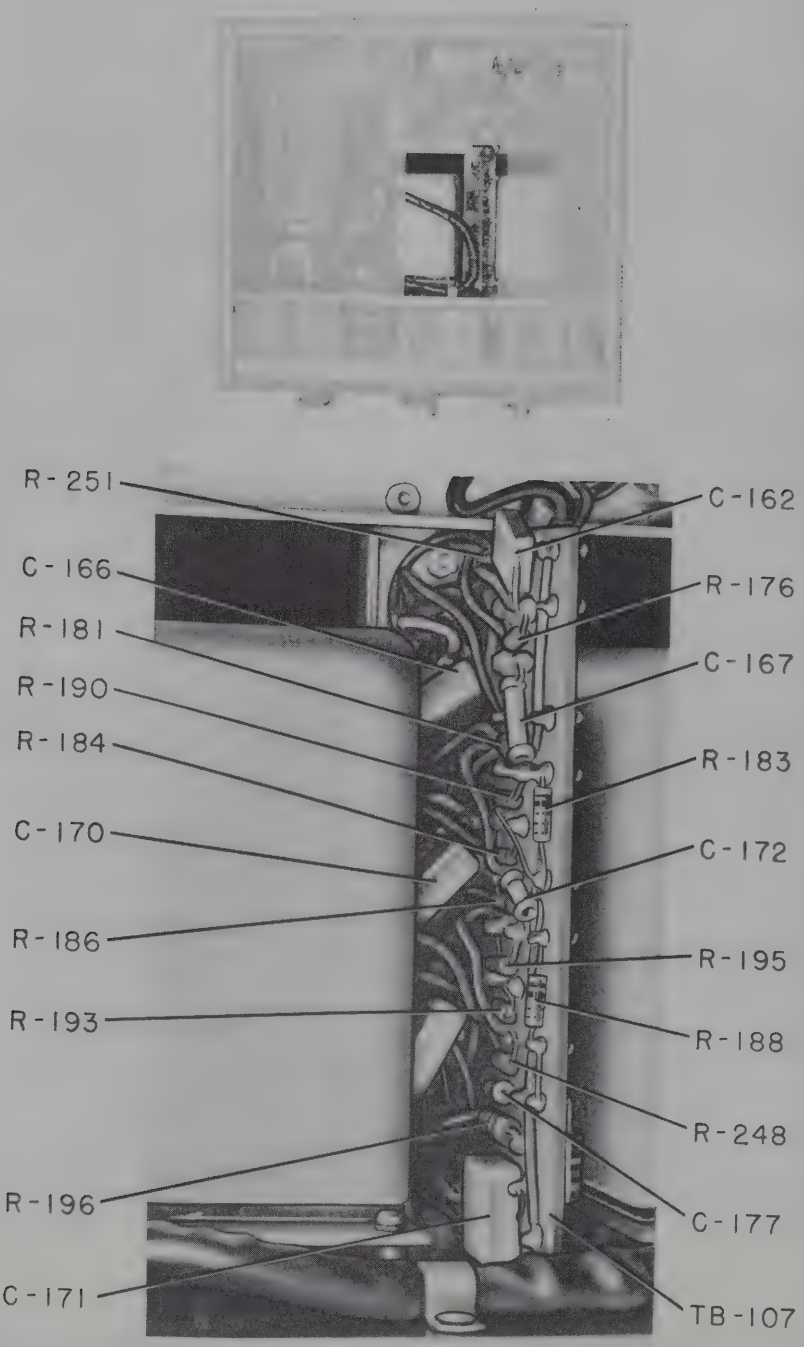


Figure 7-22. Radio Frequency Oscillator 0-317/FRT-15B, View of Bottom Center, Parts Arrangement

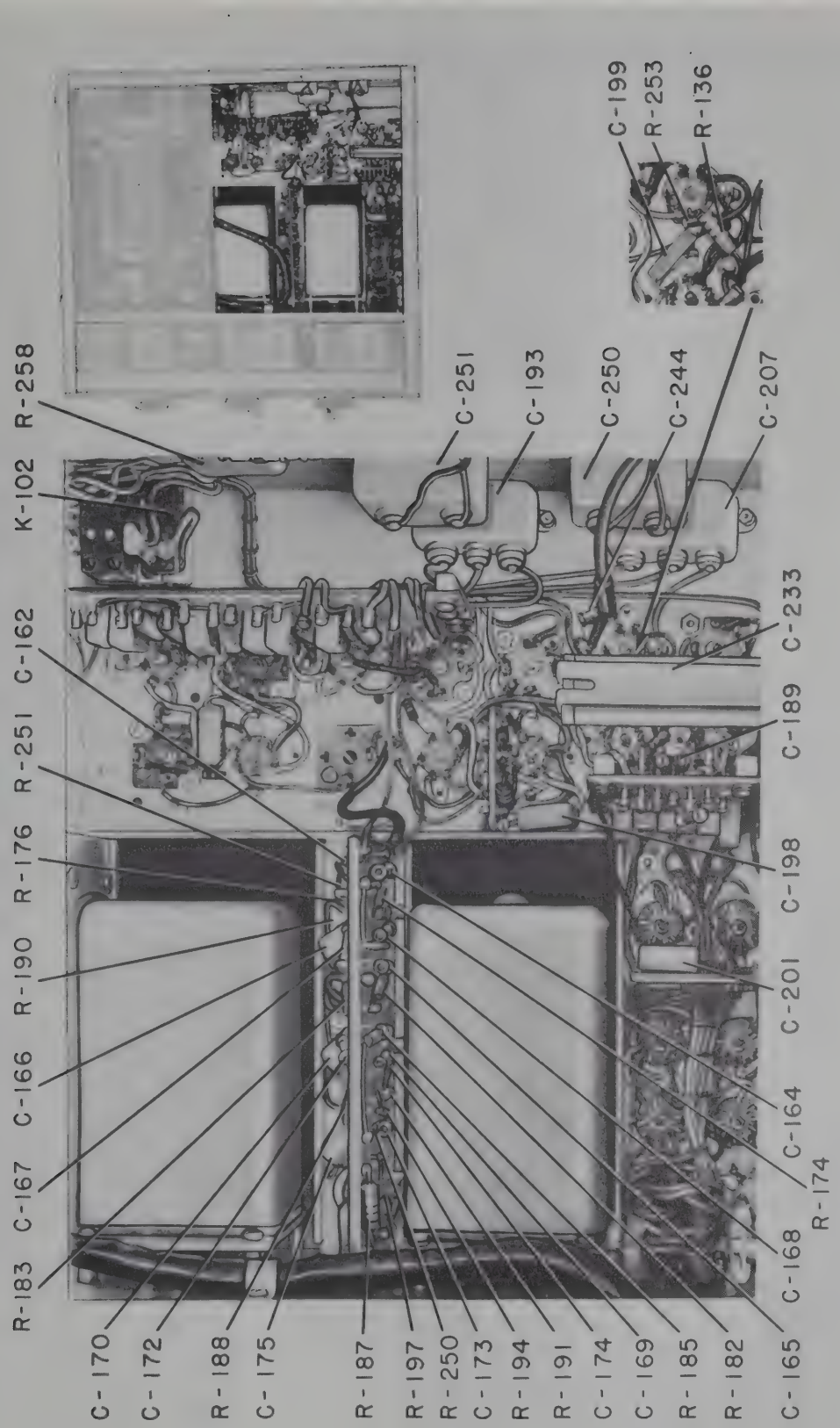


Figure 7-23. Radio Frequency Oscillator 0-317/FRT-15B, View of Bottom Left, Parts Arrangement

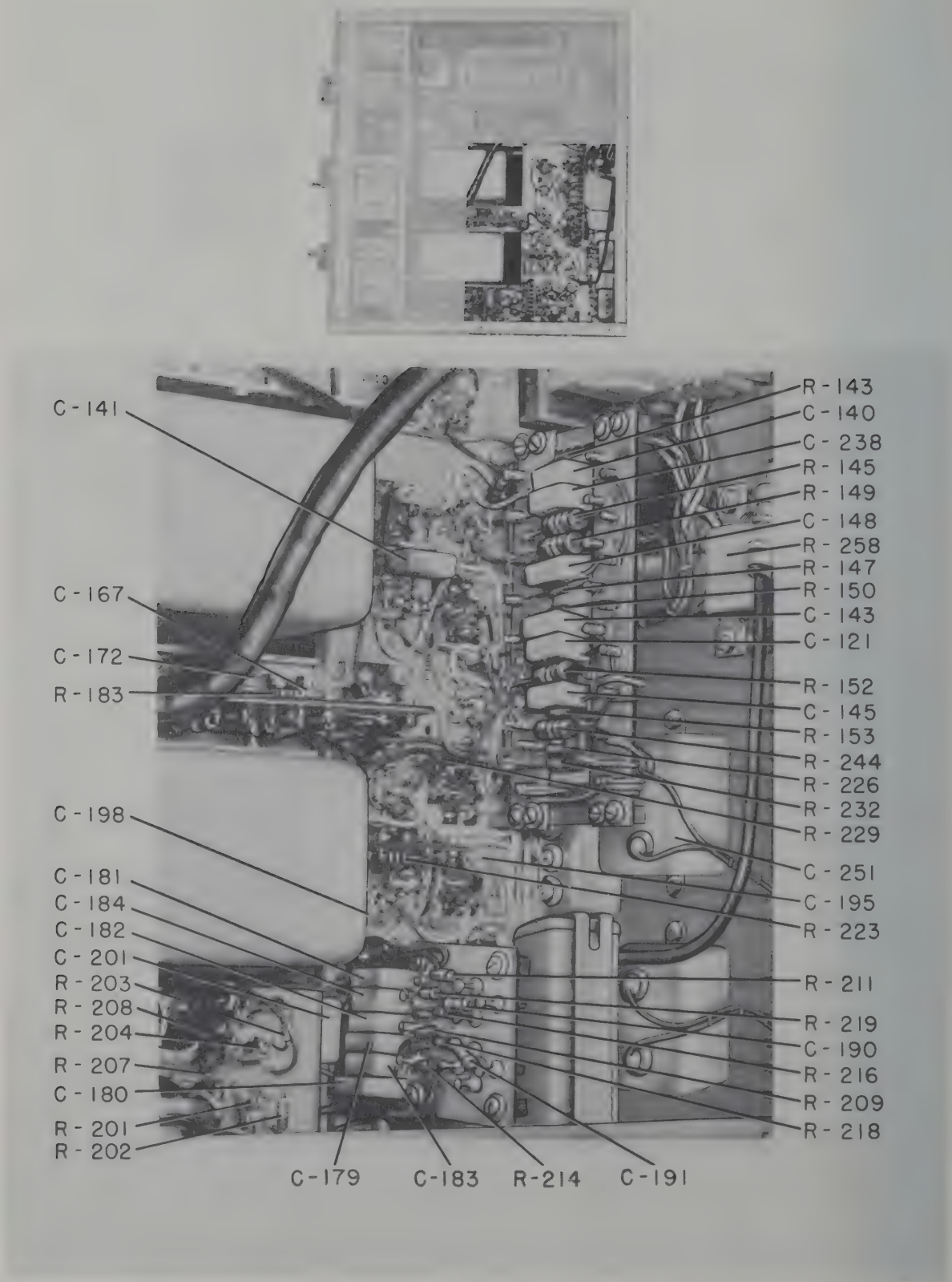


Figure 7-24. Radio Frequency Oscillator 0-317/FRT-15B, View of Bottom Left Rear, Parts Arrangemen



Figure 7-25. Radio Frequency Oscillator 0-317/FRT-15B, View of Bottom Left Front, Parts Arrangement

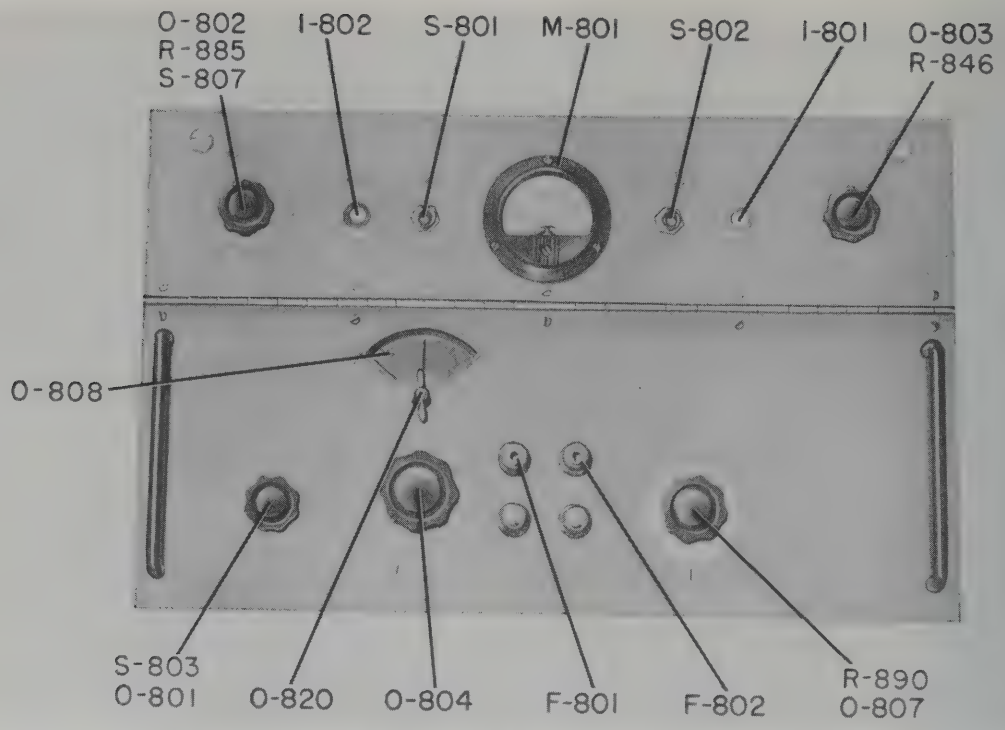


Figure 7-26. Radio Frequency Modulator MD-245/FRT-15B, Panel Parts Arrangement

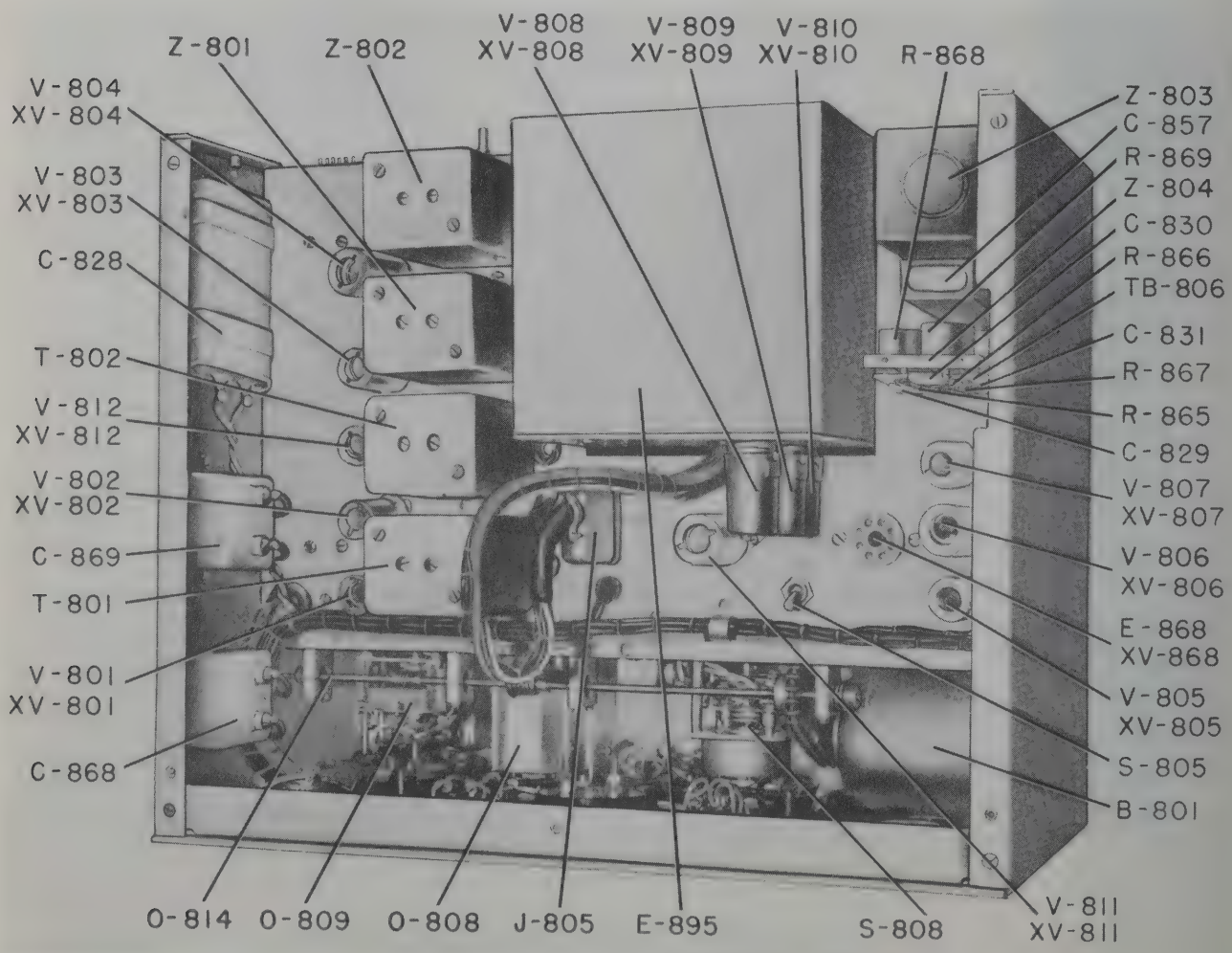


Figure 7-27. Radio Frequency Modulator MD-245/FRT-15B, Top Parts Arrangement

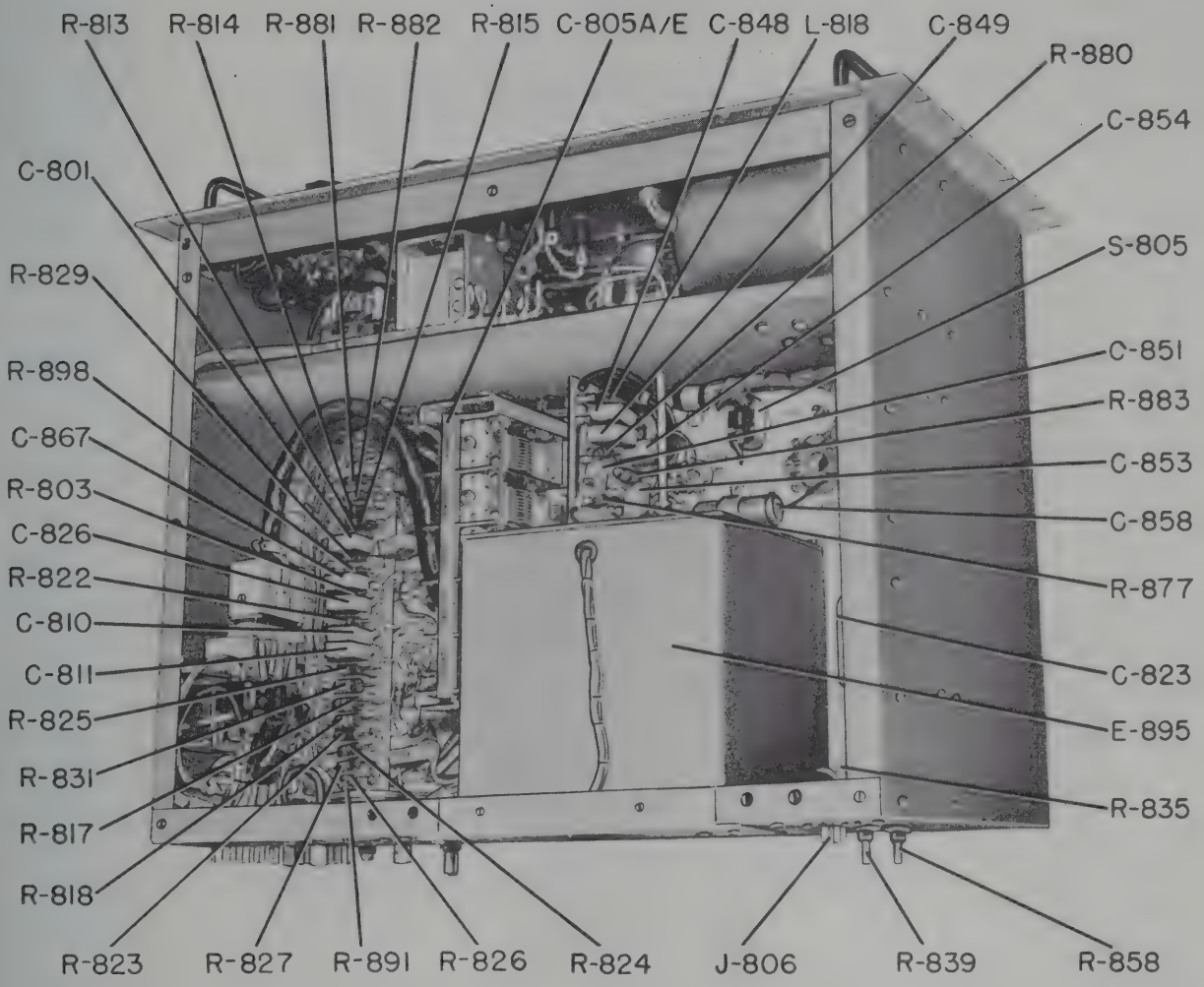


Figure 7-28. Radio Frequency Modulator MD-245/FRT-15B, Bottom From Right Side, Parts Arrangement

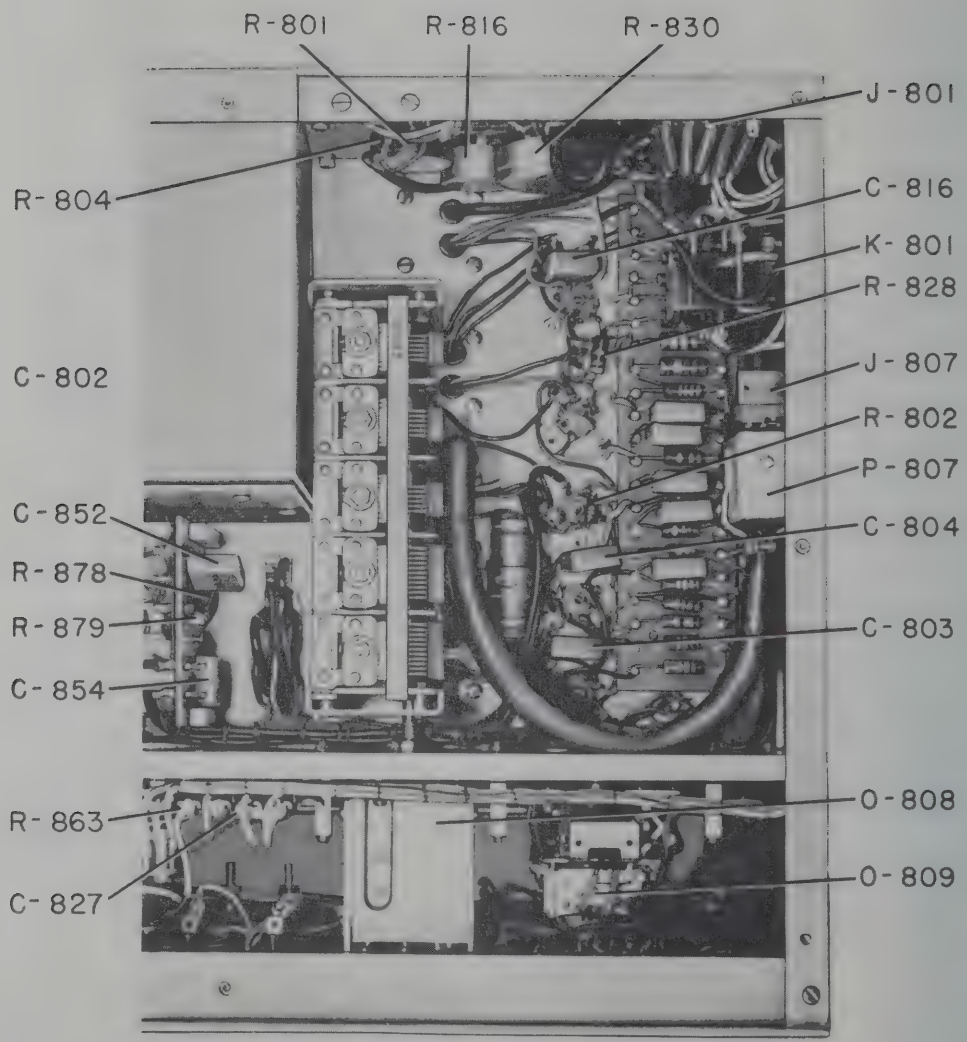


Figure 7-29. Radio Frequency Modulator MD-245/FRT-15B, View of Bottom Left, Parts Arrangement

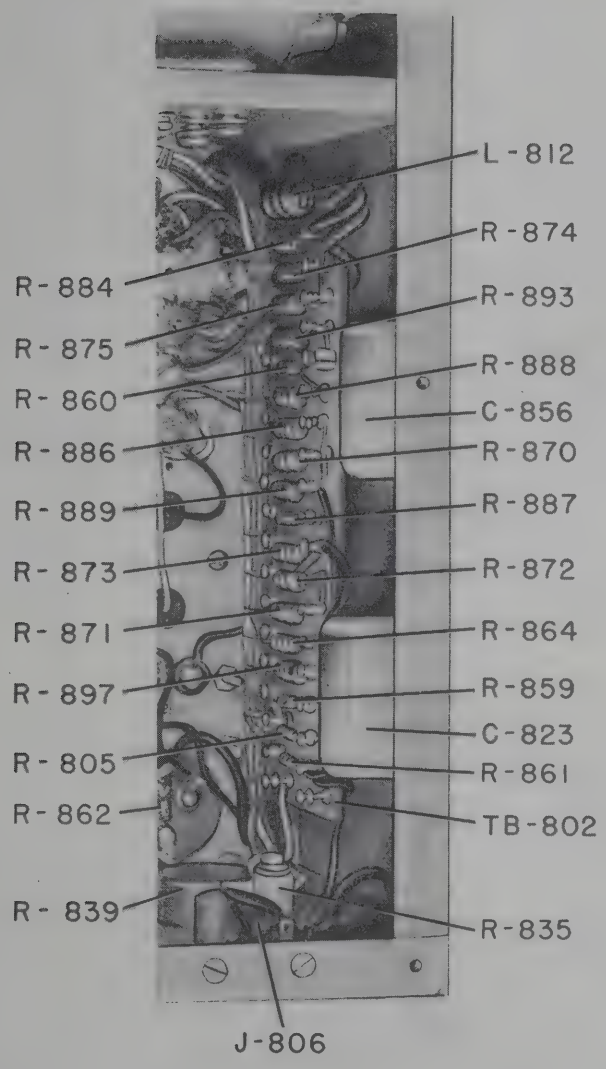


Figure 7-30. Radio Frequency Modulator MD-245/FRT-15B, View of Bottom Right, Parts Arrangement

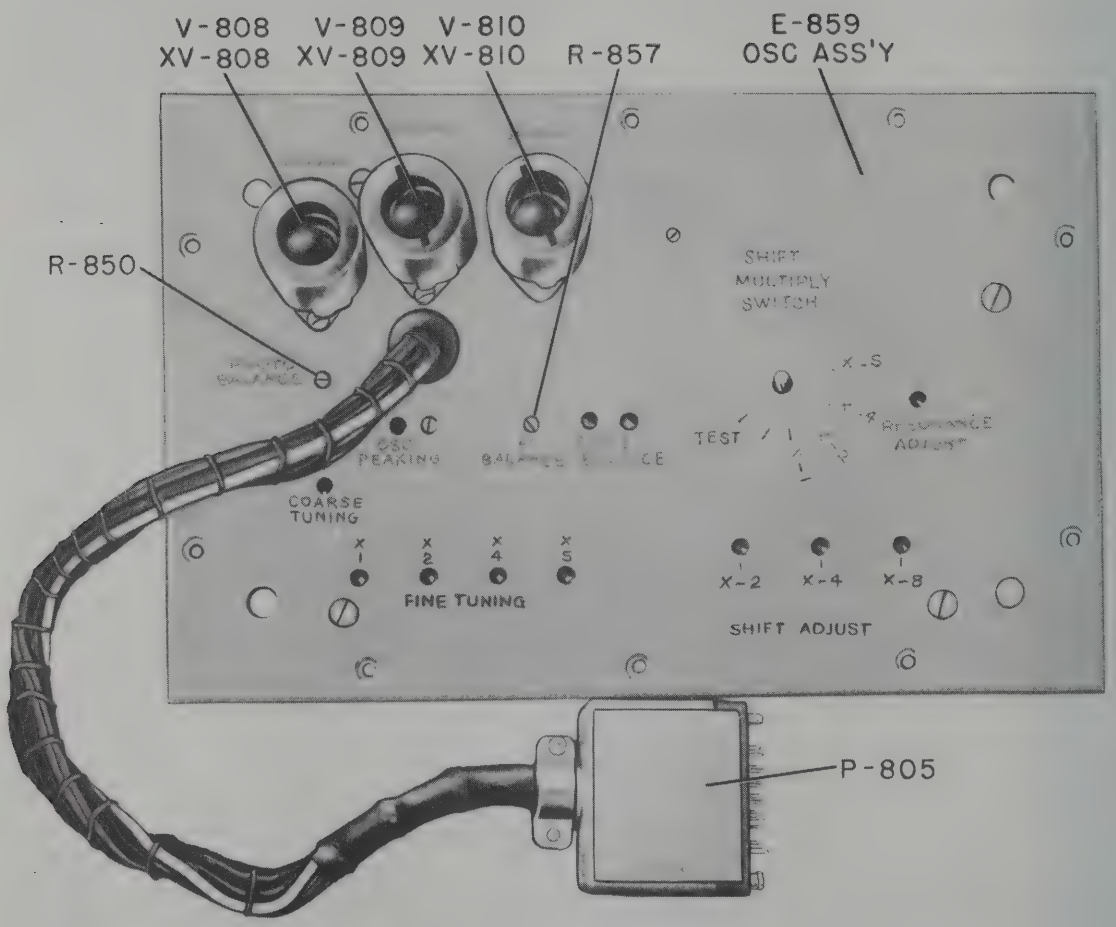
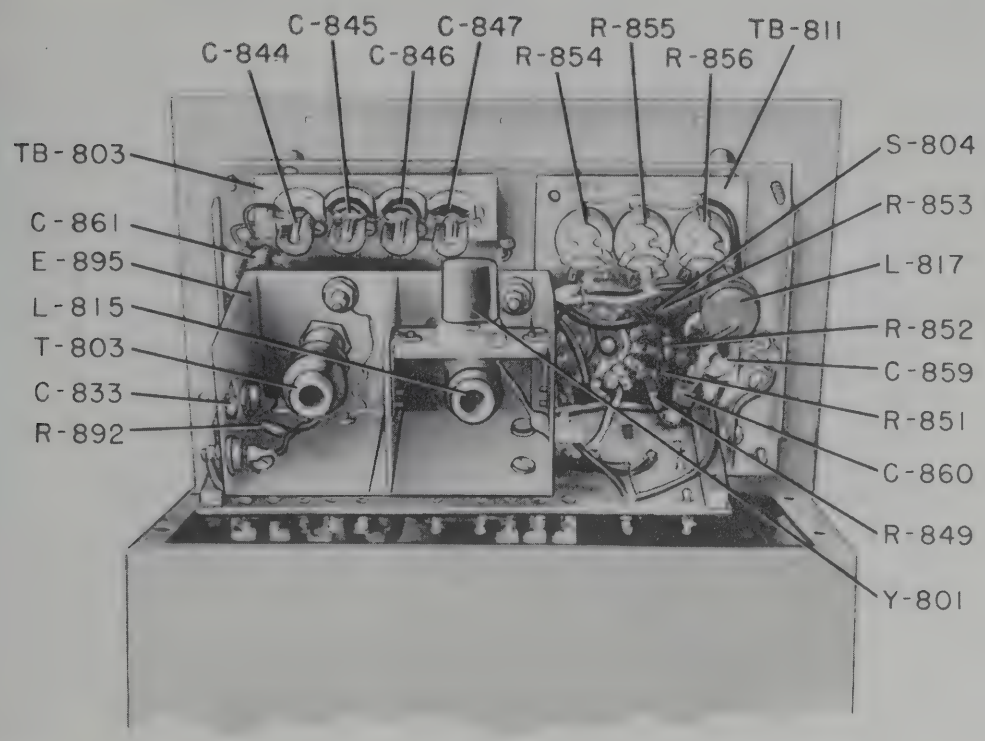


Figure 7-31. Radio Frequency Modulator MD-245/FRT-15B, Oven, Parts Arrangement



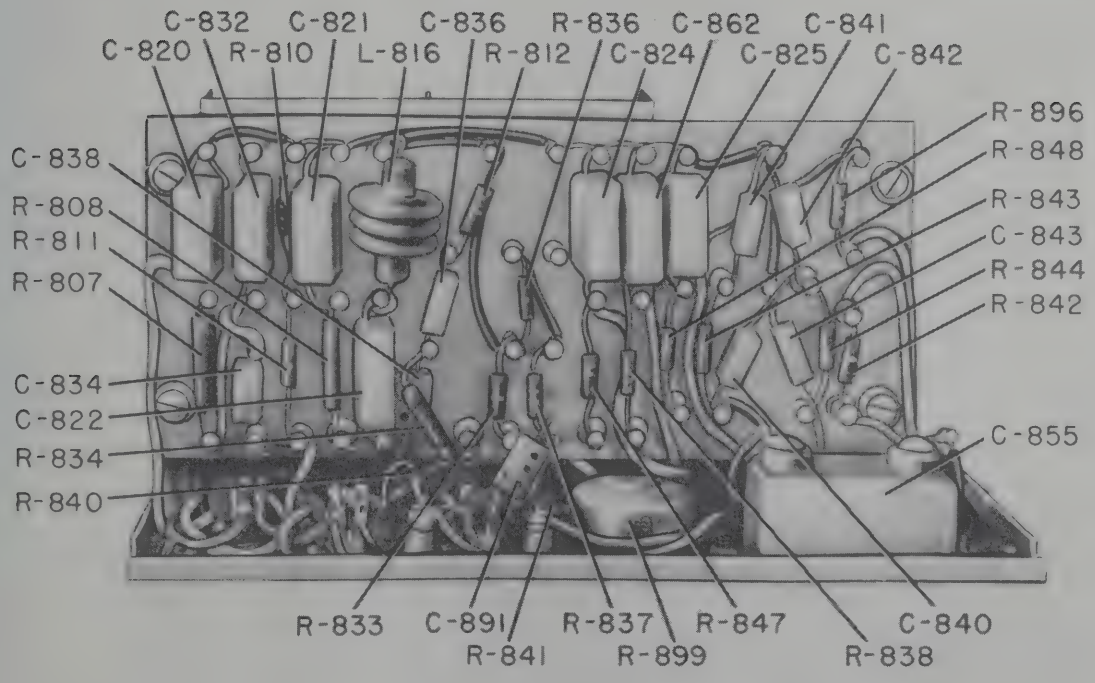


Figure 7-32. Radio Frequency Modulator MD-245/FRT-15B, Oven, Parts Arrangement

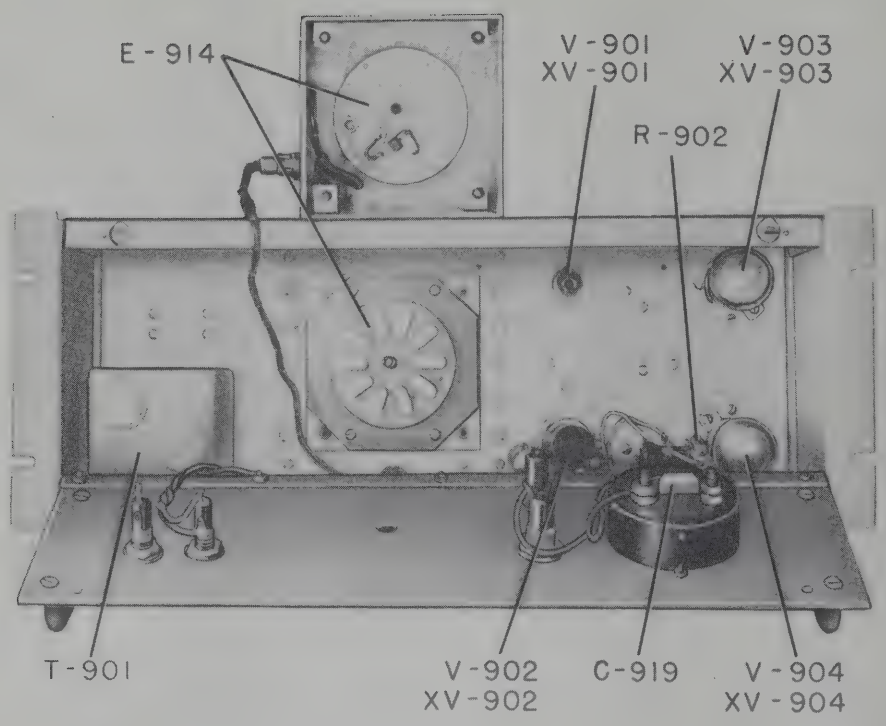


Figure 7-33. Radio Frequency Oscillator 0-324/FRT-15B, Panel and Oven Open, Parts Arrangement

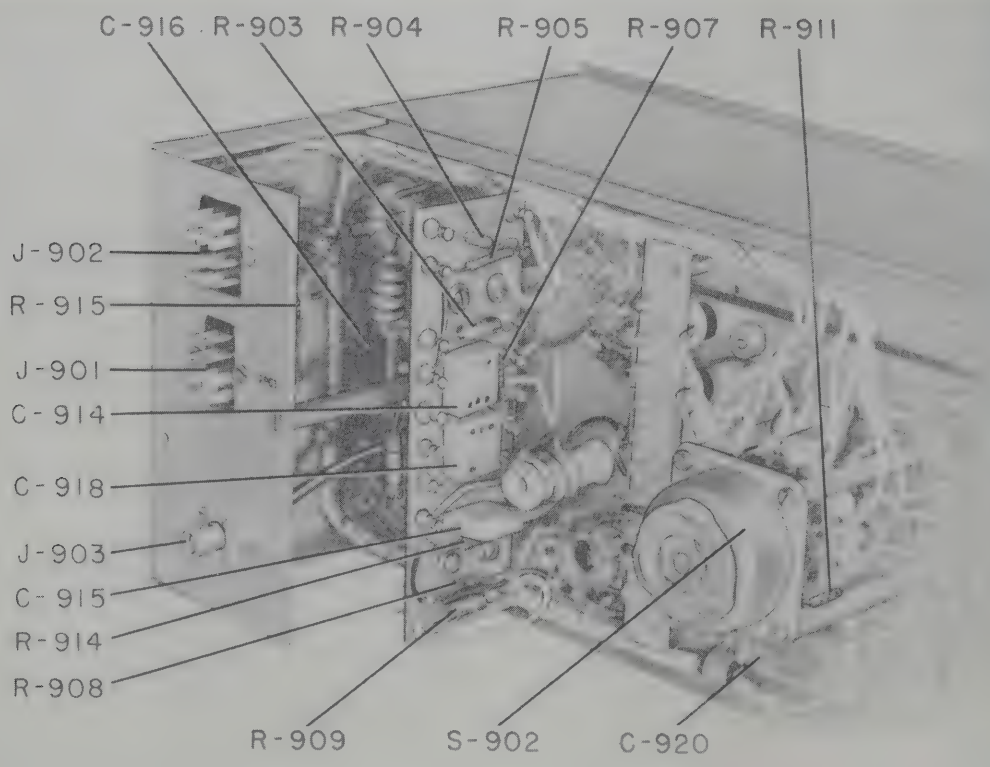


Figure 7-34. Radio Frequency Oscillator 0-324/FRT-15B, View of Rear Right, Parts Arrangement

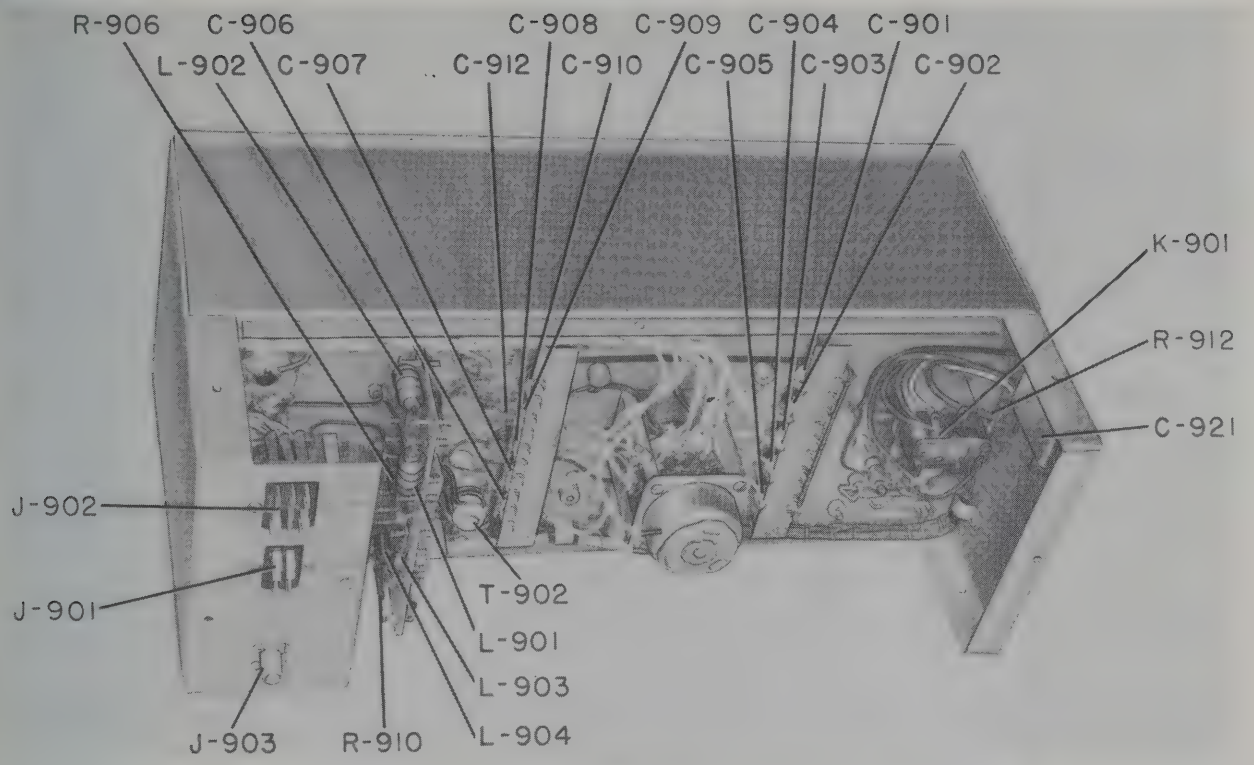


Figure 7-35. Radio Frequency Oscillator 0-324/FRT-15B, View of Rear Left, Parts Arrangement

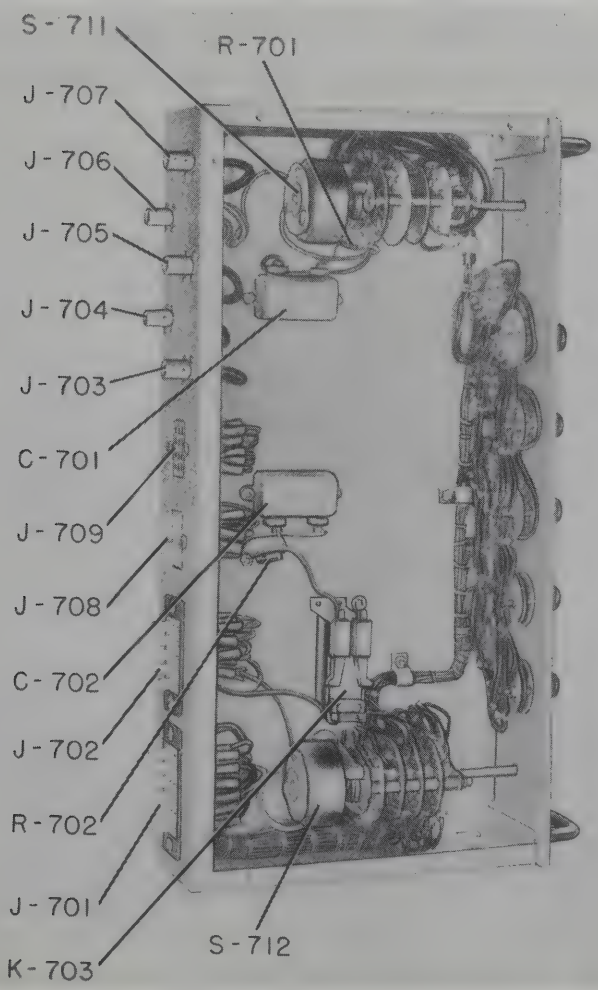


Figure 7-36. Excitation Control, Bottom Parts Arrangement

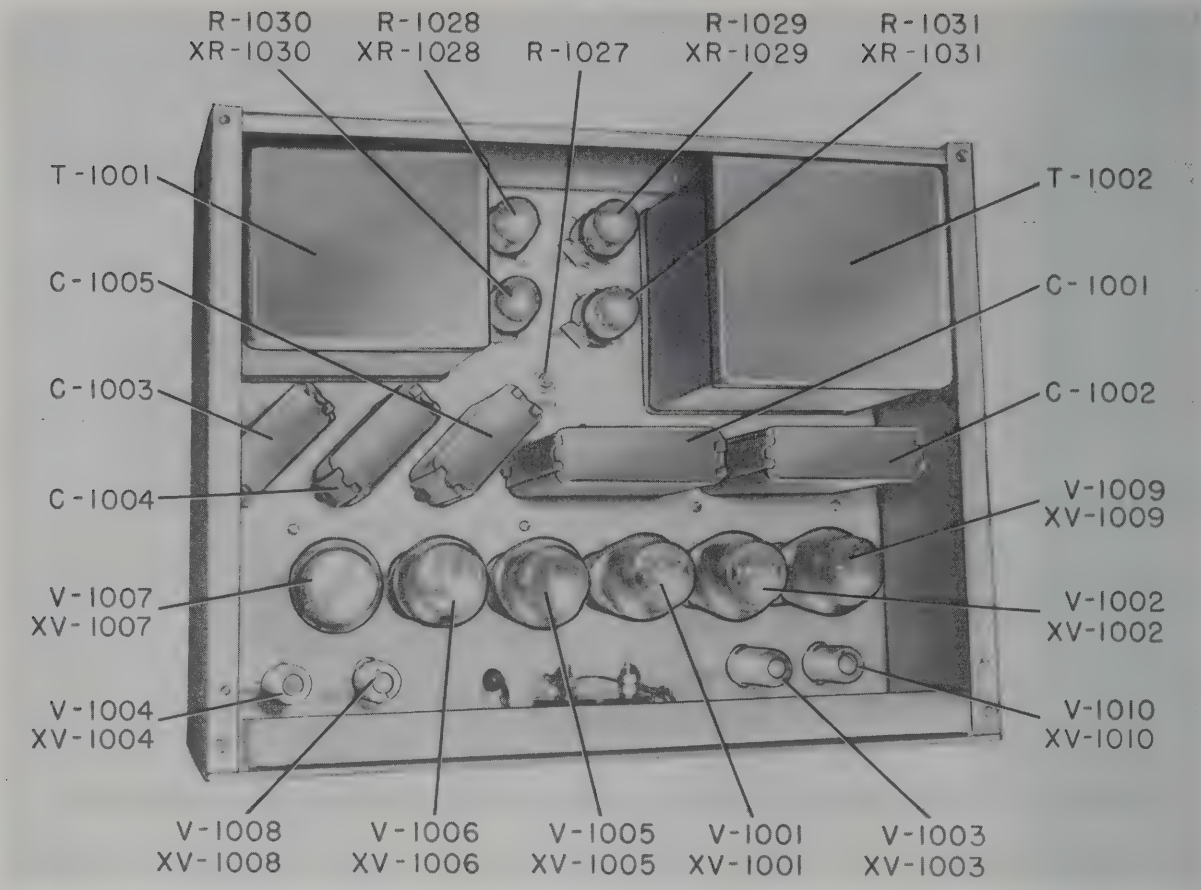


Figure 7-37. Power Supply PP-1197/FRT-15B, Top Parts Arrangement

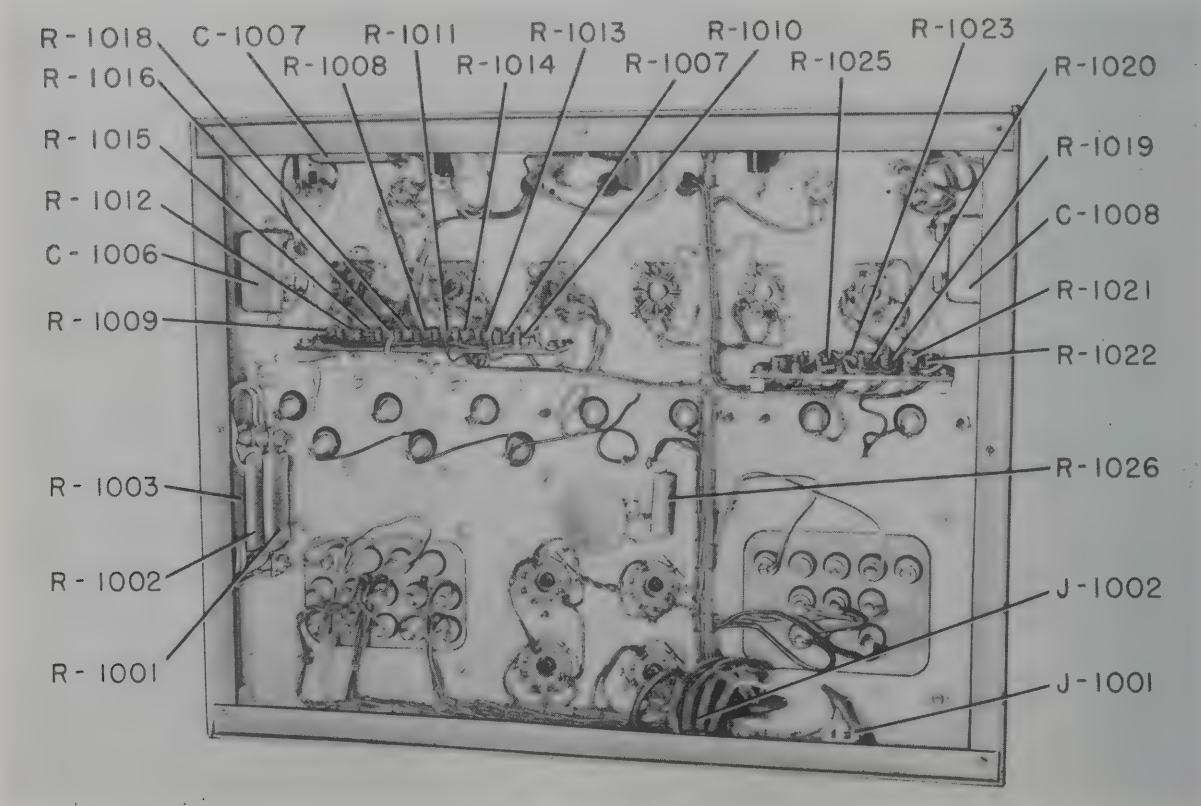
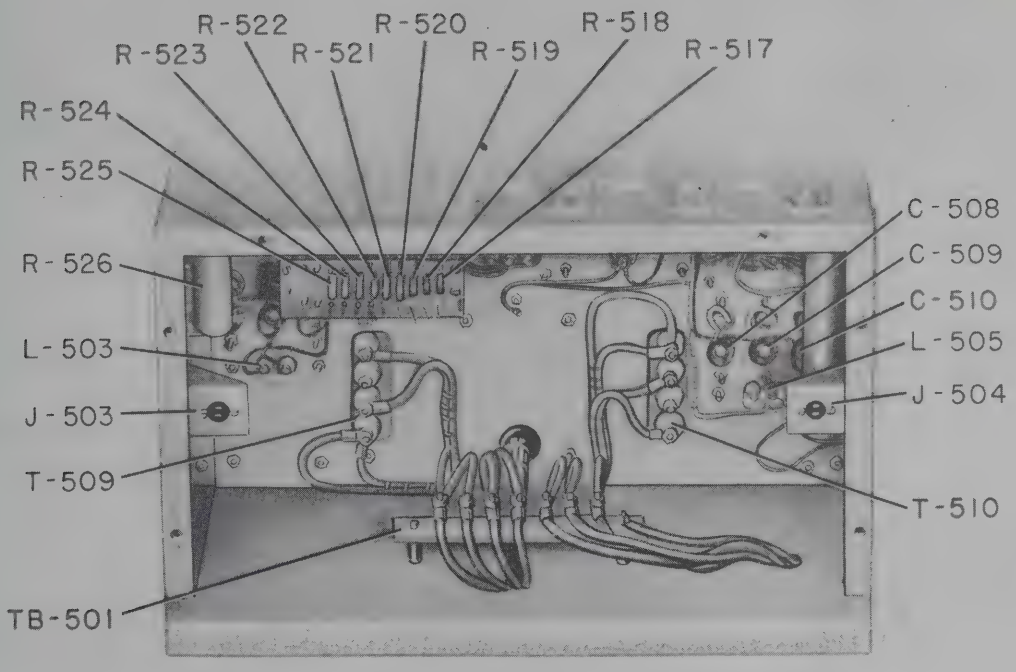


Figure 7-38. Power Supply PP-1197/FRT-15B, Bottom Parts Arrangement



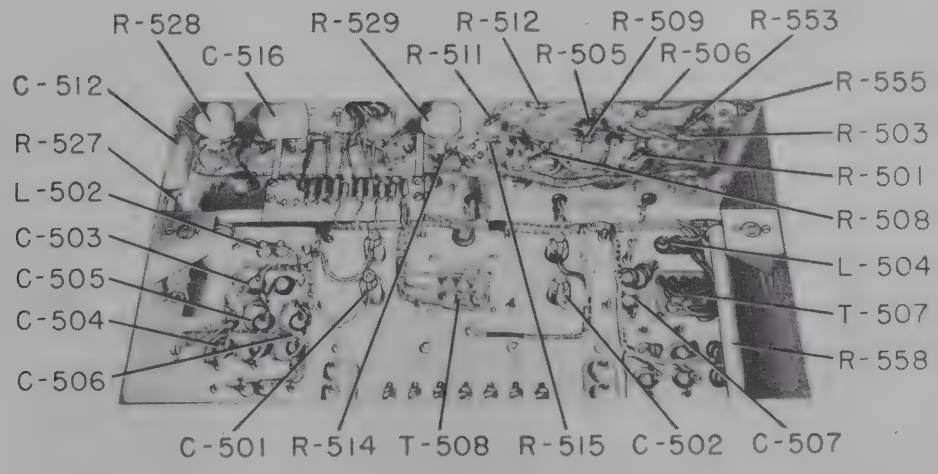


Figure 7-39. Bottom Section Front, Power Supply Assembly PP-1198/FRT-15B

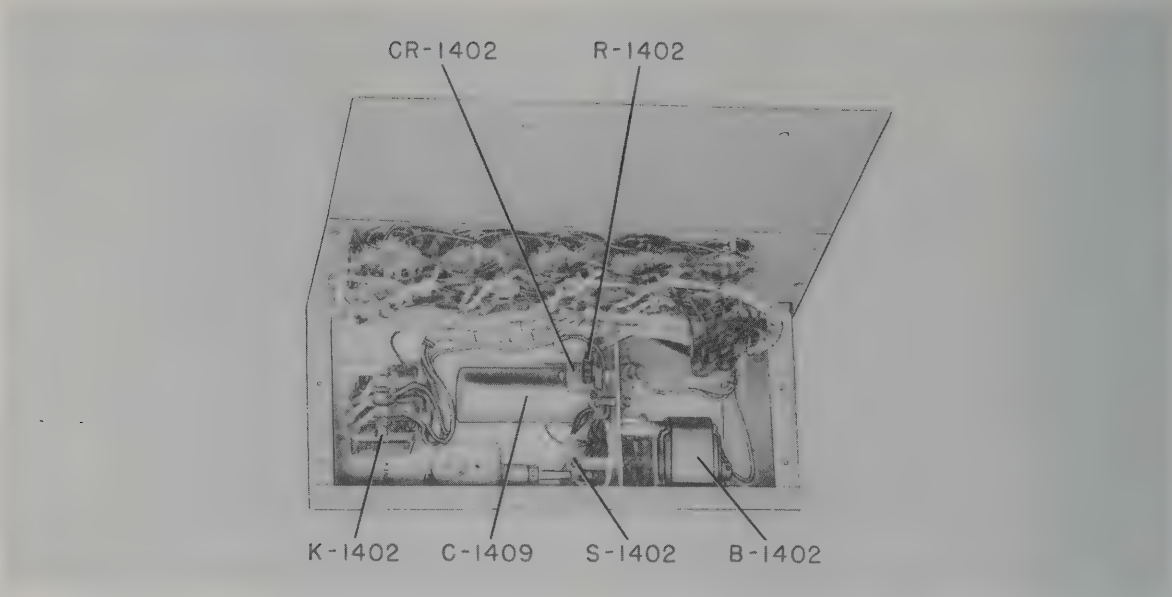


Figure 7-40. Antenna Matching Network, Bottom Panel Open, Right Corner, Parts Arrangement

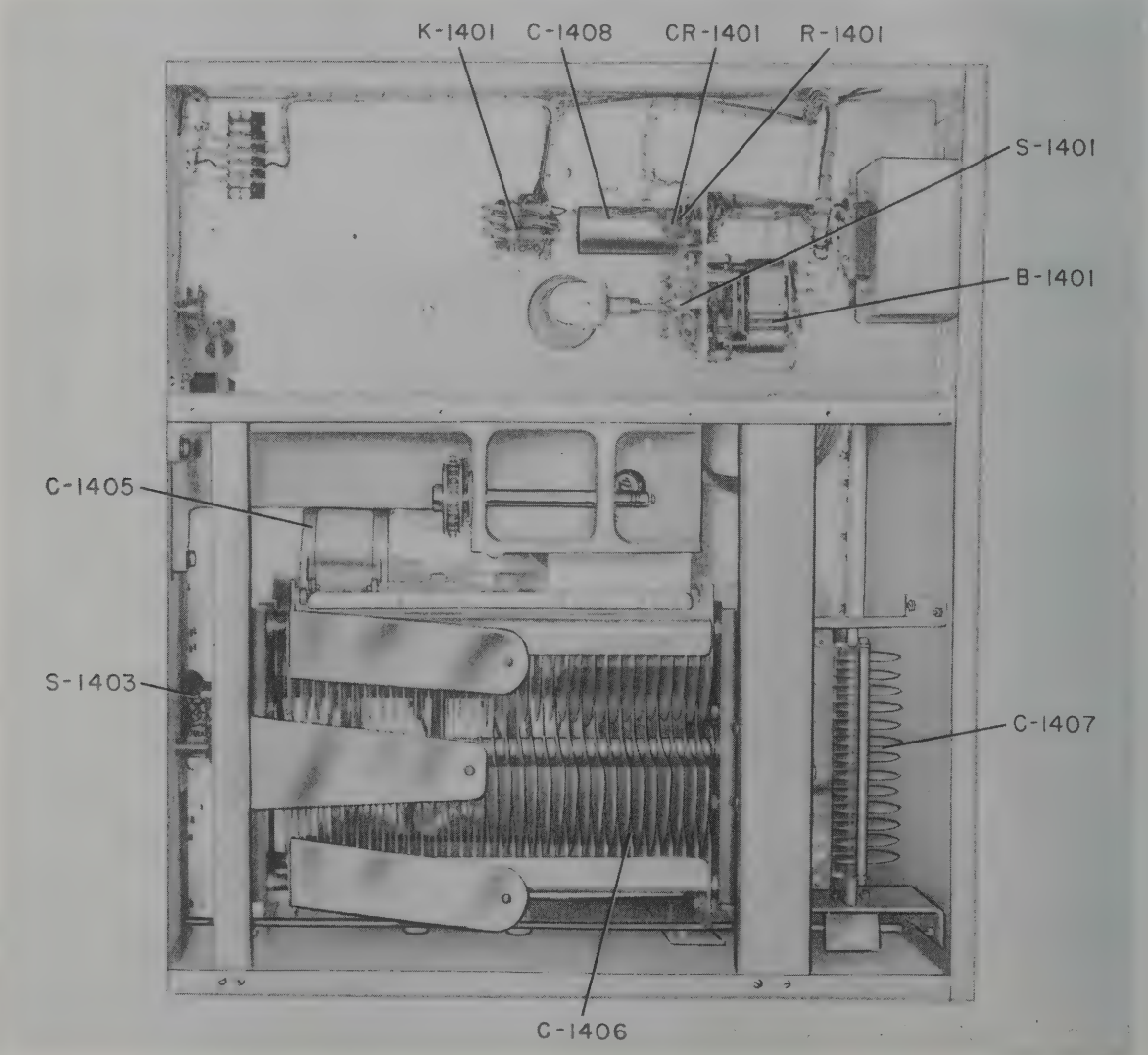


Figure 7-41. Antenna Matching Network, Top Parts Arrangement

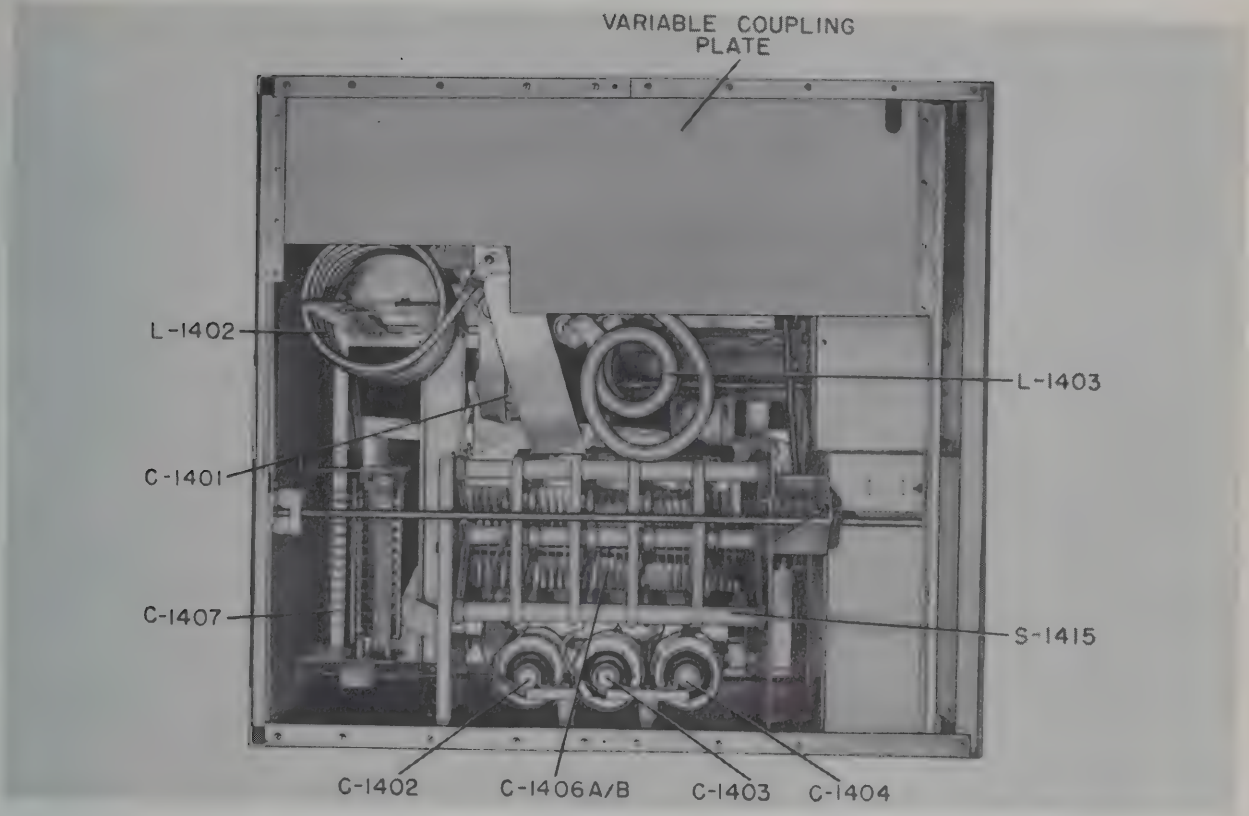


Figure 7-42. Antenna Matching Network, Bottom With Coupling Plate At Left Side, Parts Arrangement

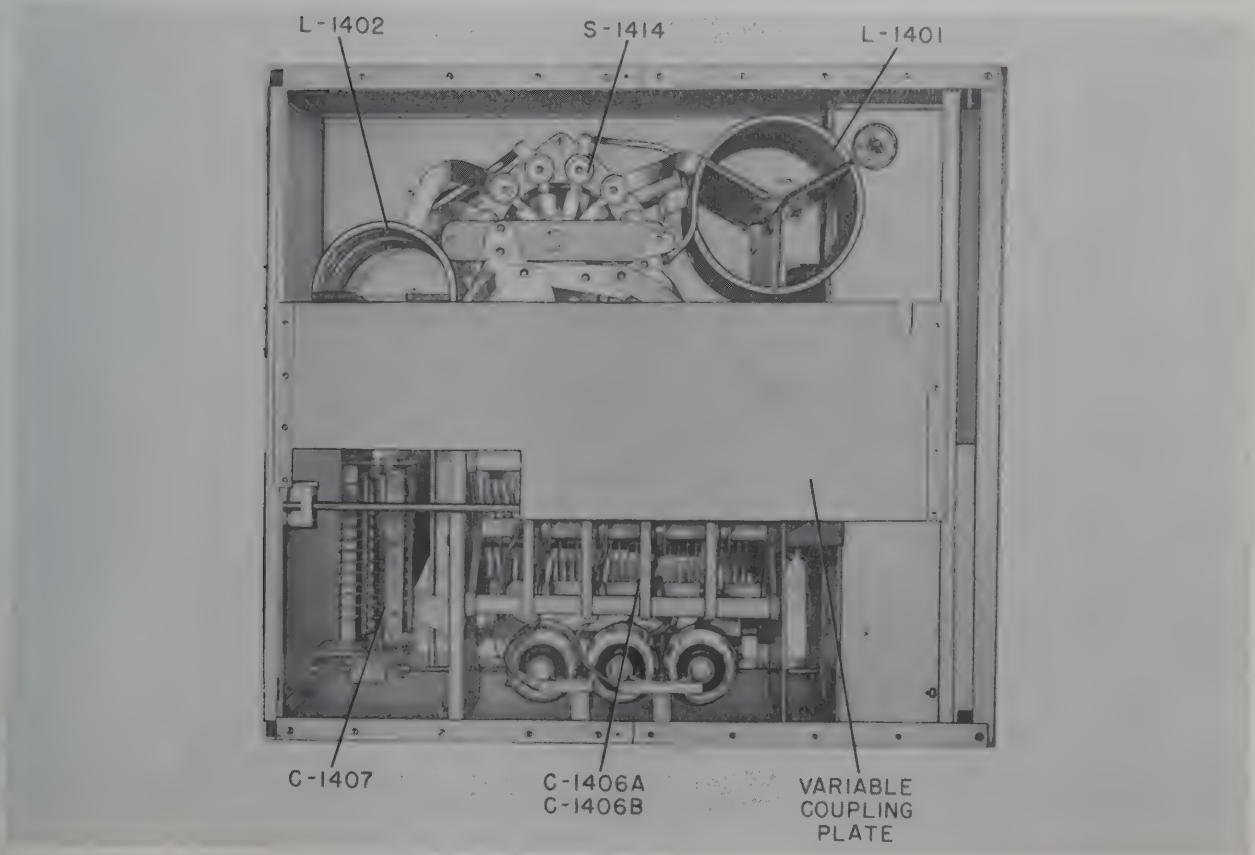


Figure 7-43. Antenna Matching Network, Bottom With Coupling Plate At Center of Chassis, Parts Arrangement

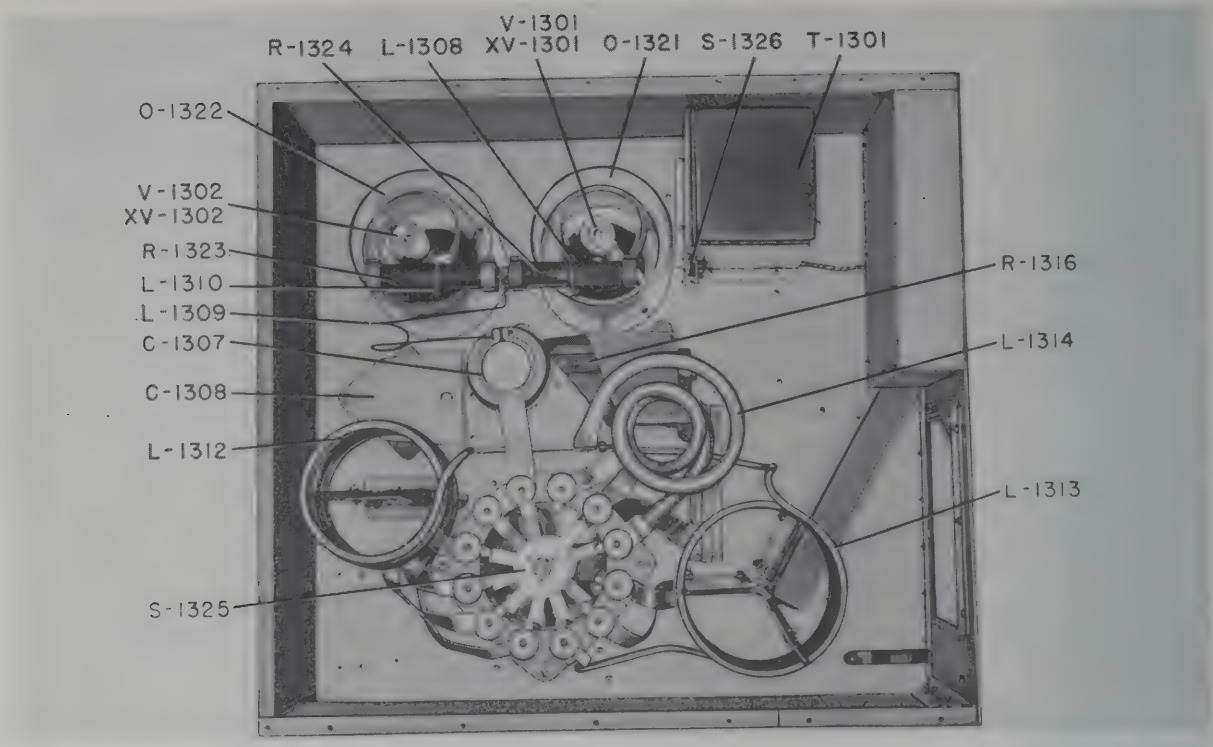


Figure 7-44. Power Amplifier, Top Parts Arrangement

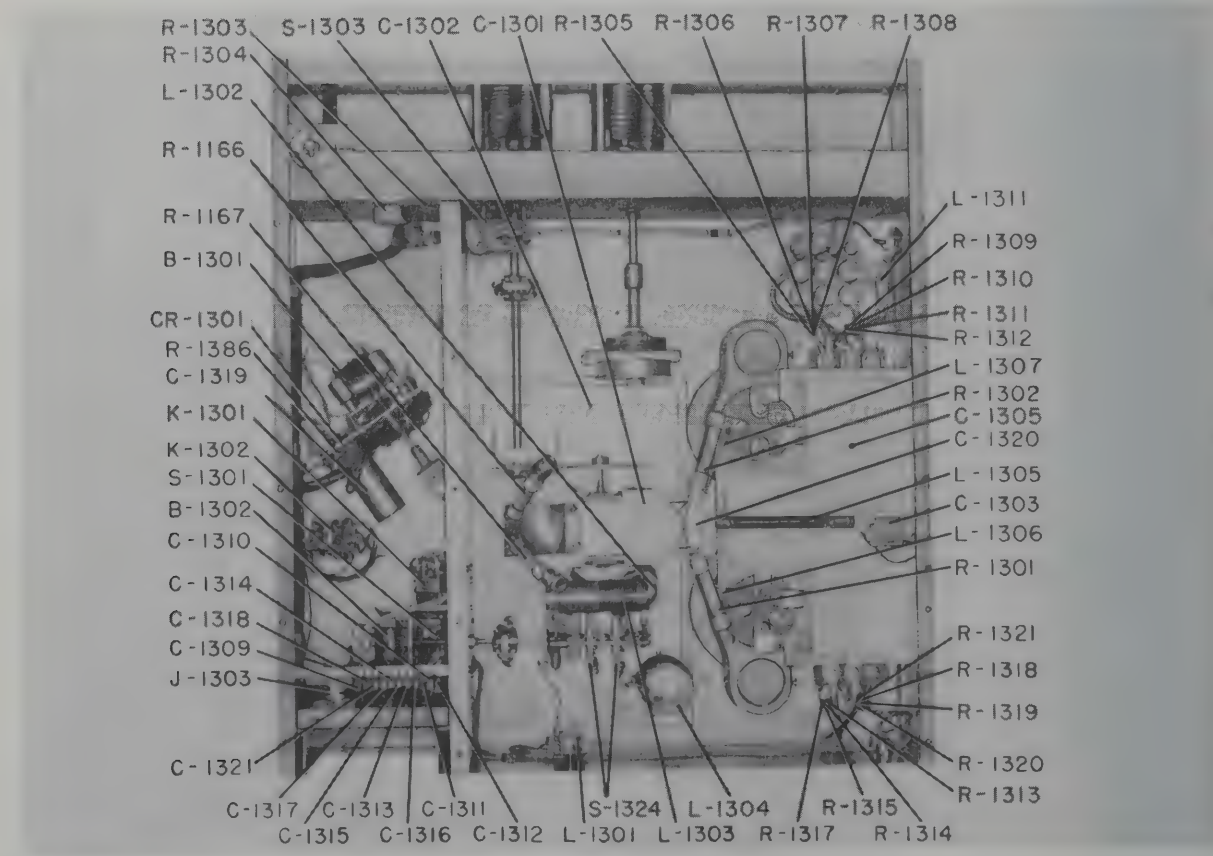


Figure 7-45. Power Amplifier, Bottom Parts Arrangement

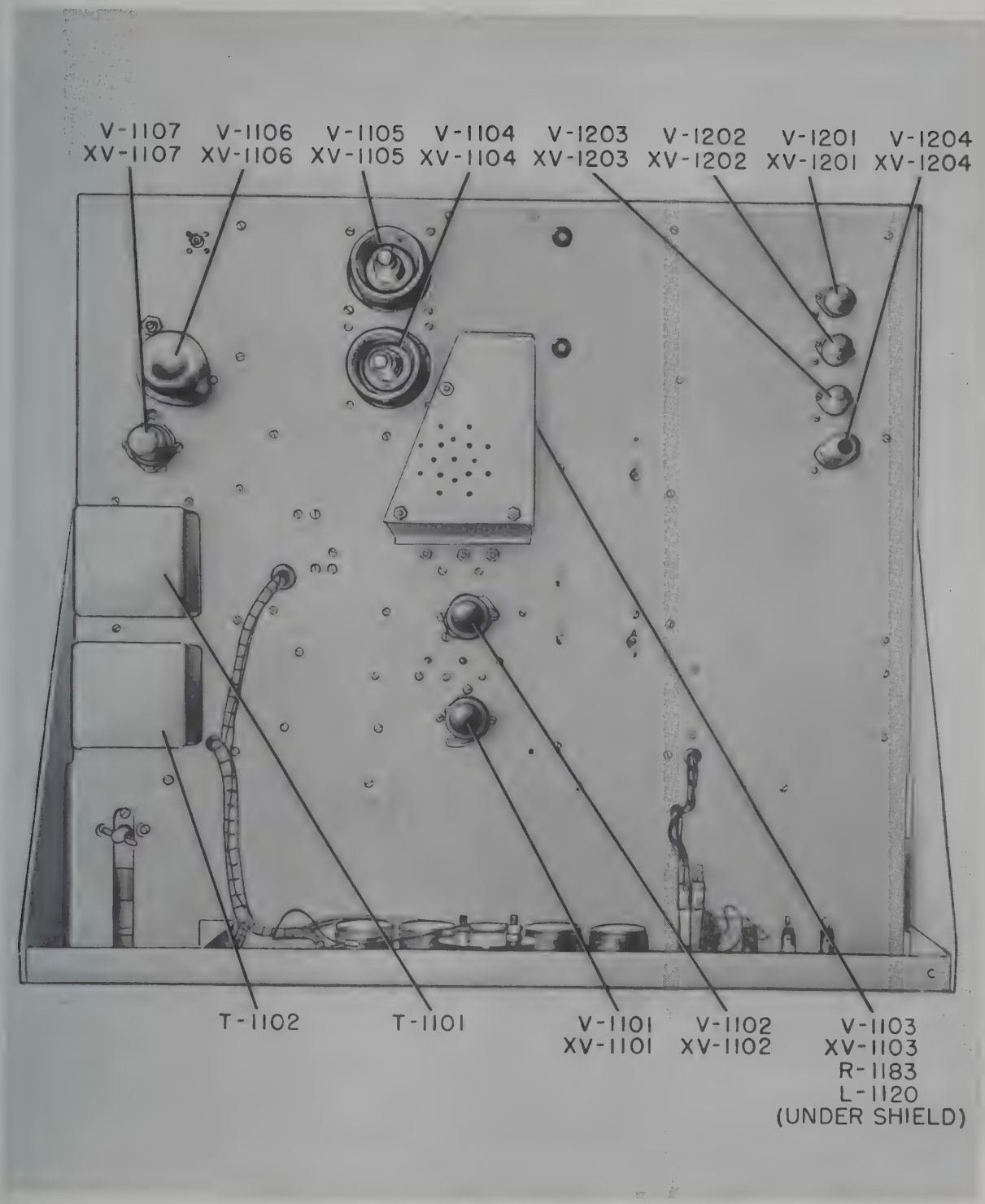


Figure 7-46. Exciter IPA, Top, Parts Arrangement

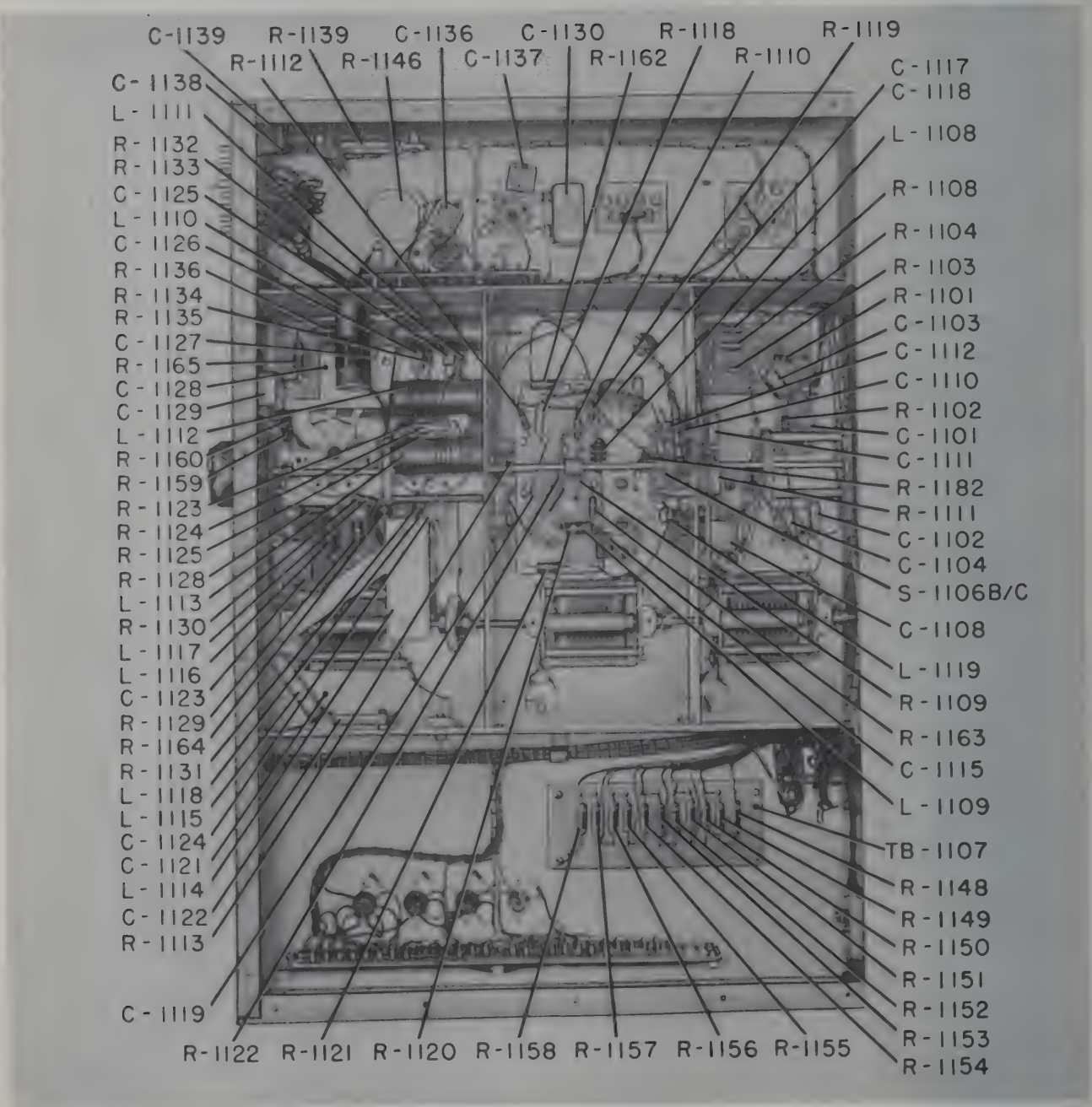


Figure 7-47. Exciter IPA, Bottom, Parts Arrangement

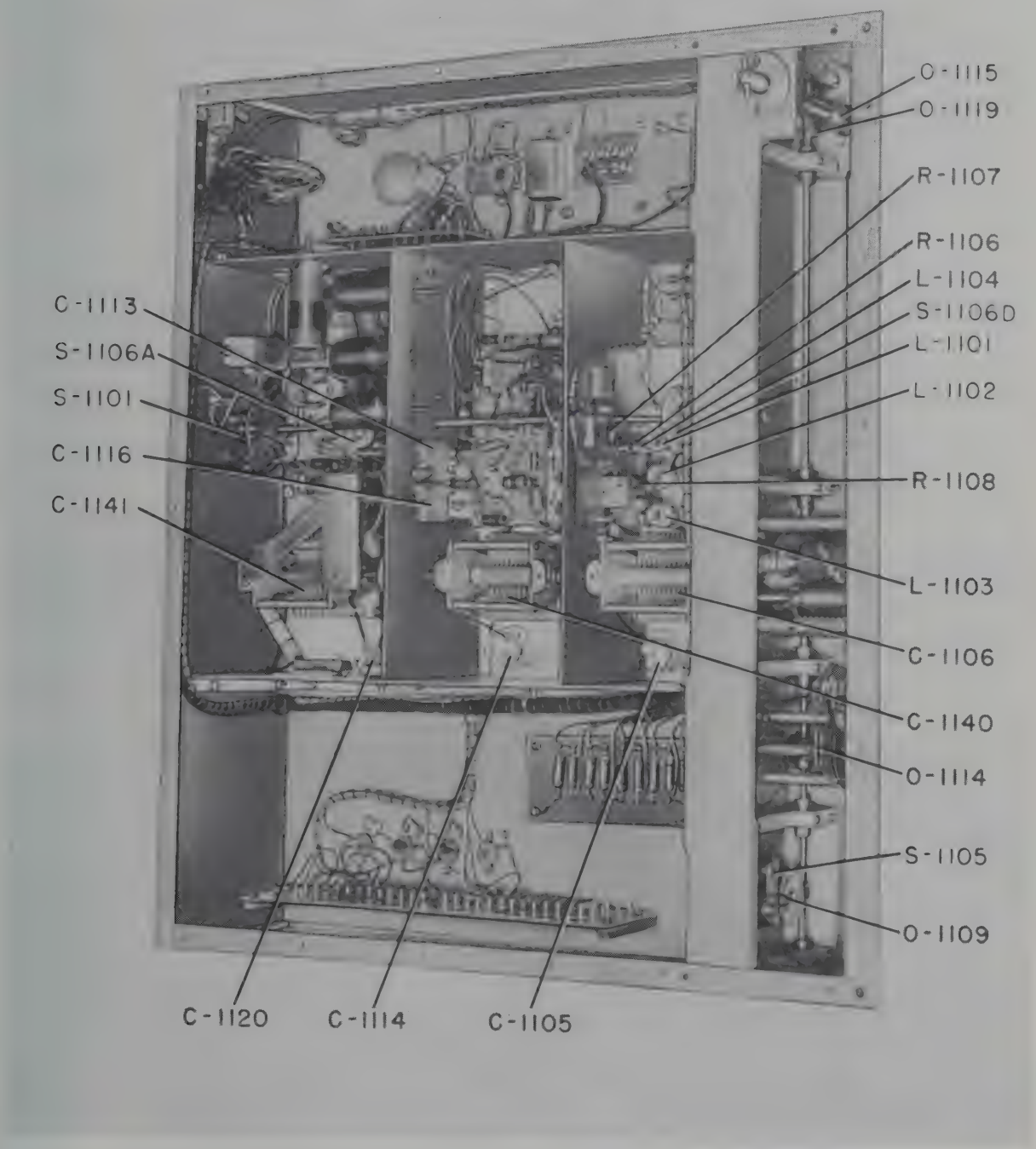


Figure 7-48. Exciter IPA, View of Bottom From Front, Parts Arrangement

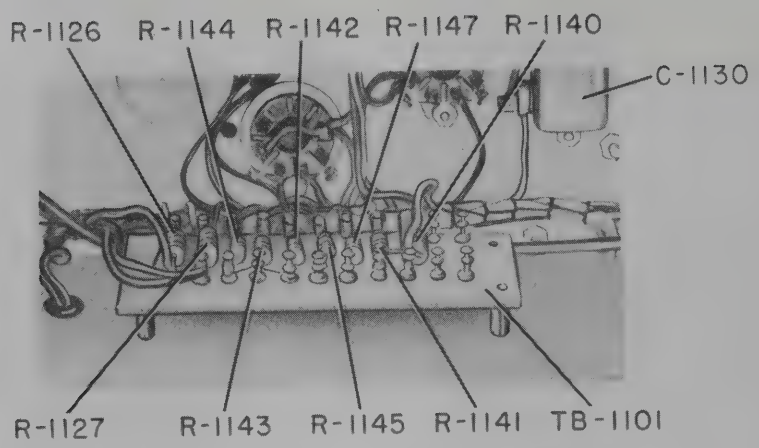


Figure 7-49. Exciter IPA, View of Bottom Rear Left, Parts Arrangement

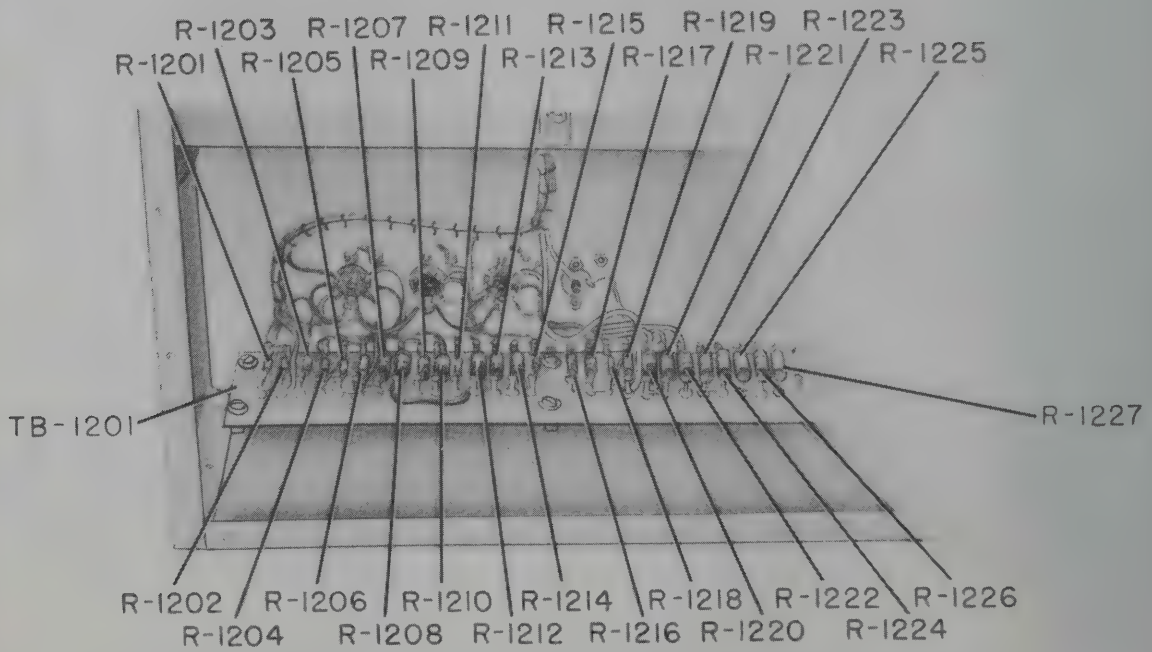


Figure 7-50. Exciter IPA, View of Bottom Right Side, Parts Arrangement

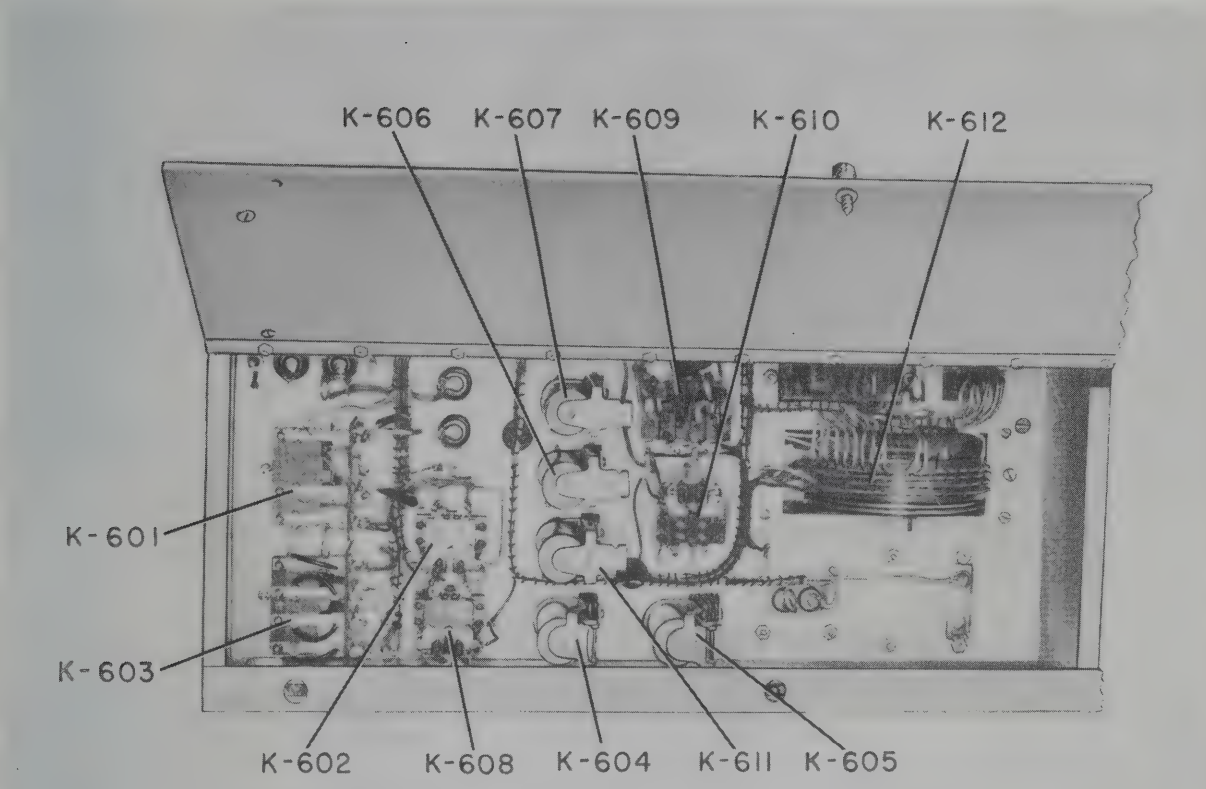


Figure 7-51. Autotune Control, Panel Open, Parts Arrangement

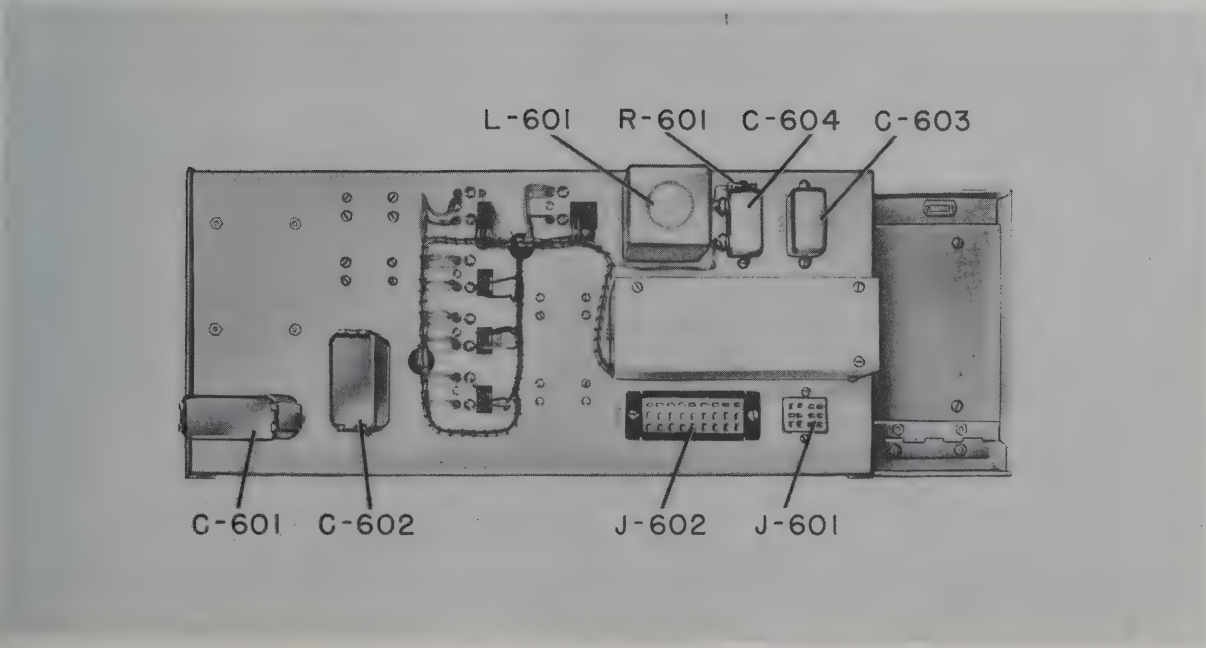


Figure 7-52. Autotune Control, Rear, Parts Arrangement

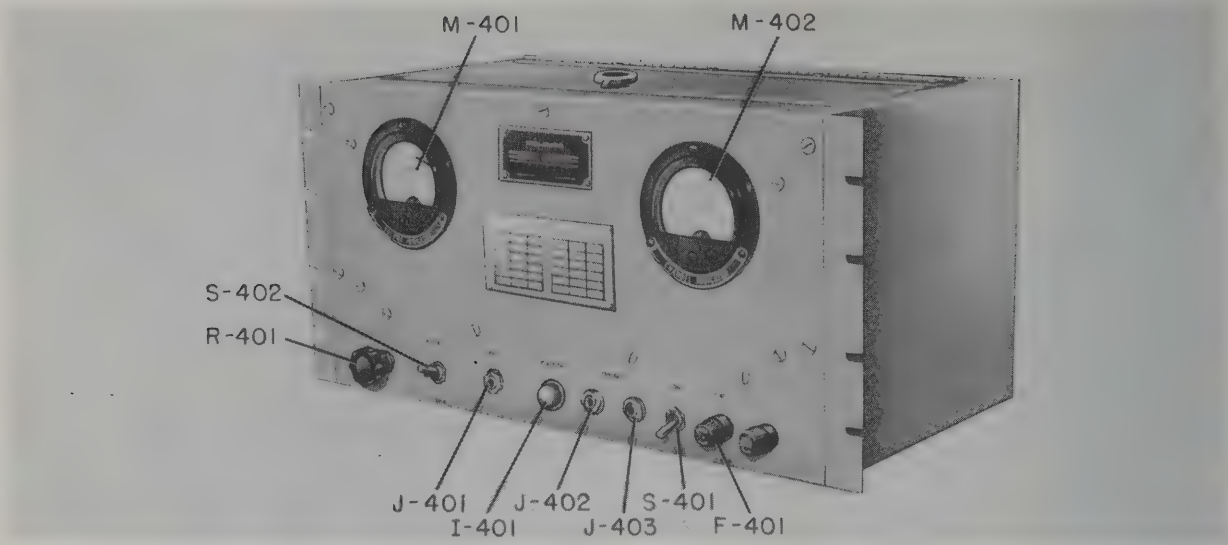


Figure 7-53. Transmitter Control C-1501/FRT-15B, Panel, Parts Arrangement

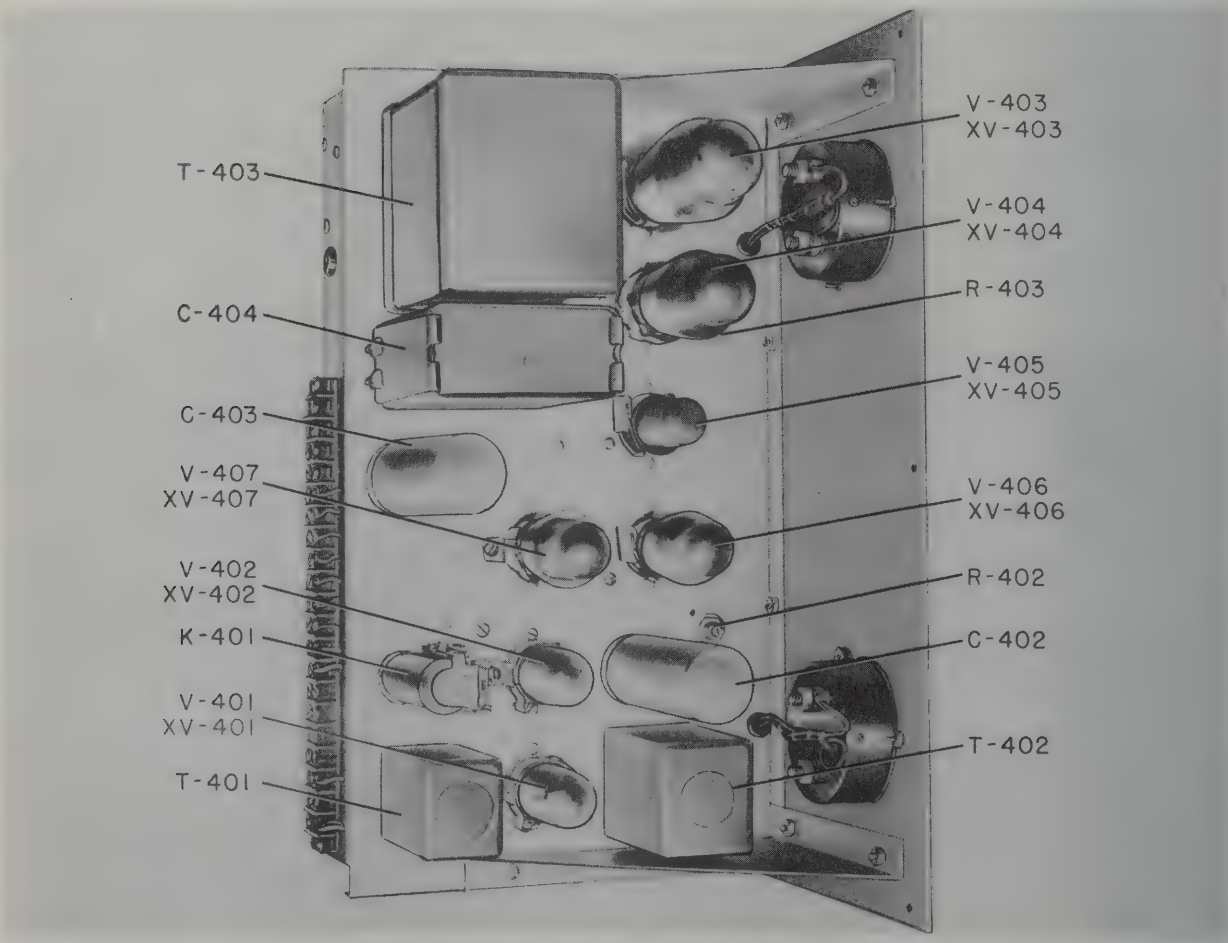


Figure 7-54. Transmitter Control C-1501/FRT-15B, Top, Parts Arrangement

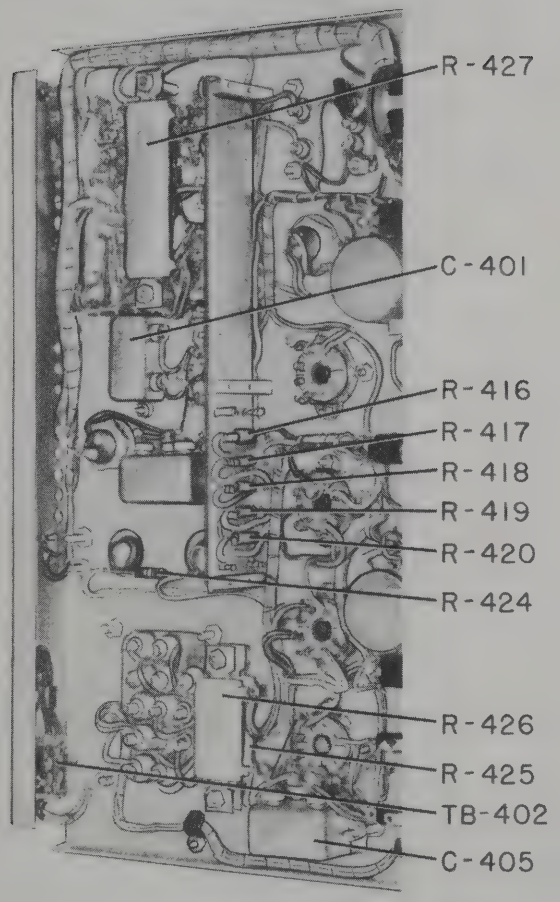


Figure 7-55. Transmitter Control C-1501/FRT-15B, View From Bottom Front, Parts Arrangement

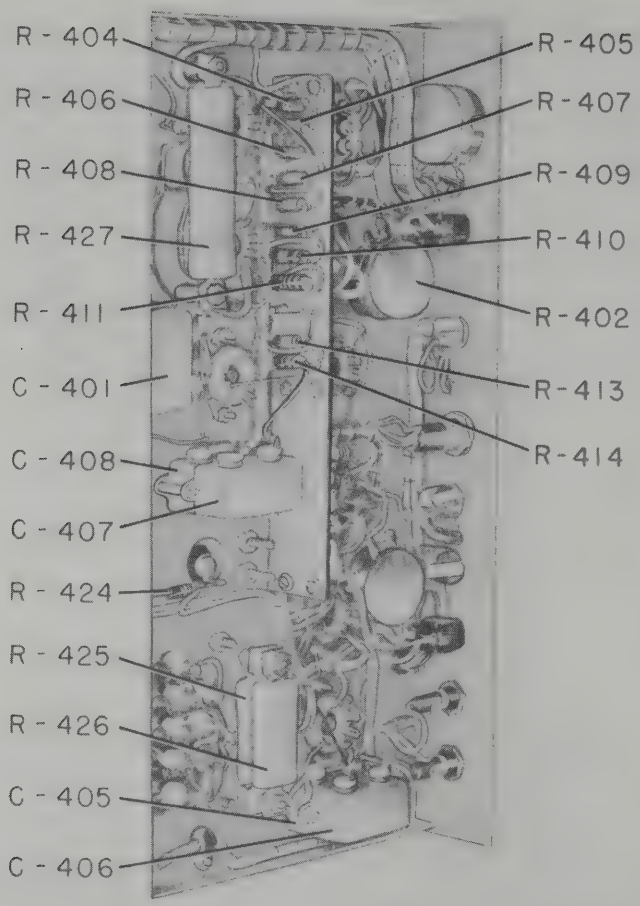


Figure 7-56. Transmitter Control C-1501/FRT-15B, View From Bottom Rear, Parts Arrangement

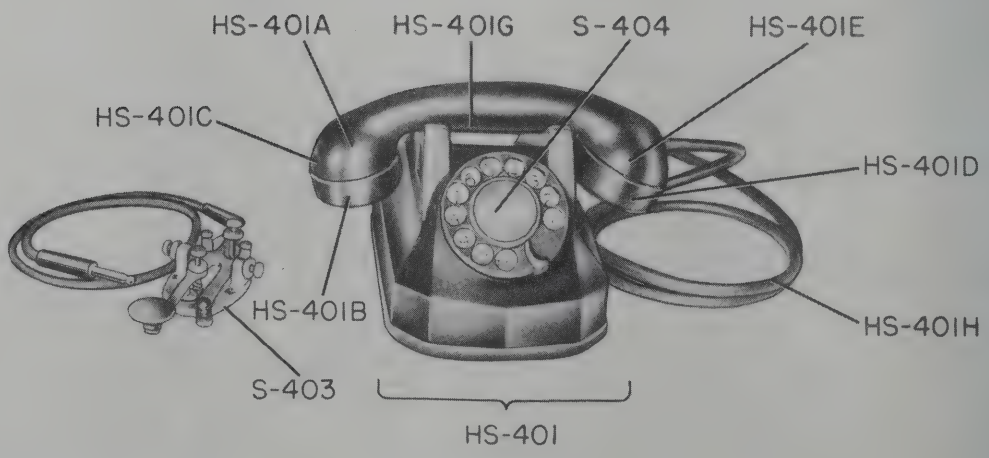
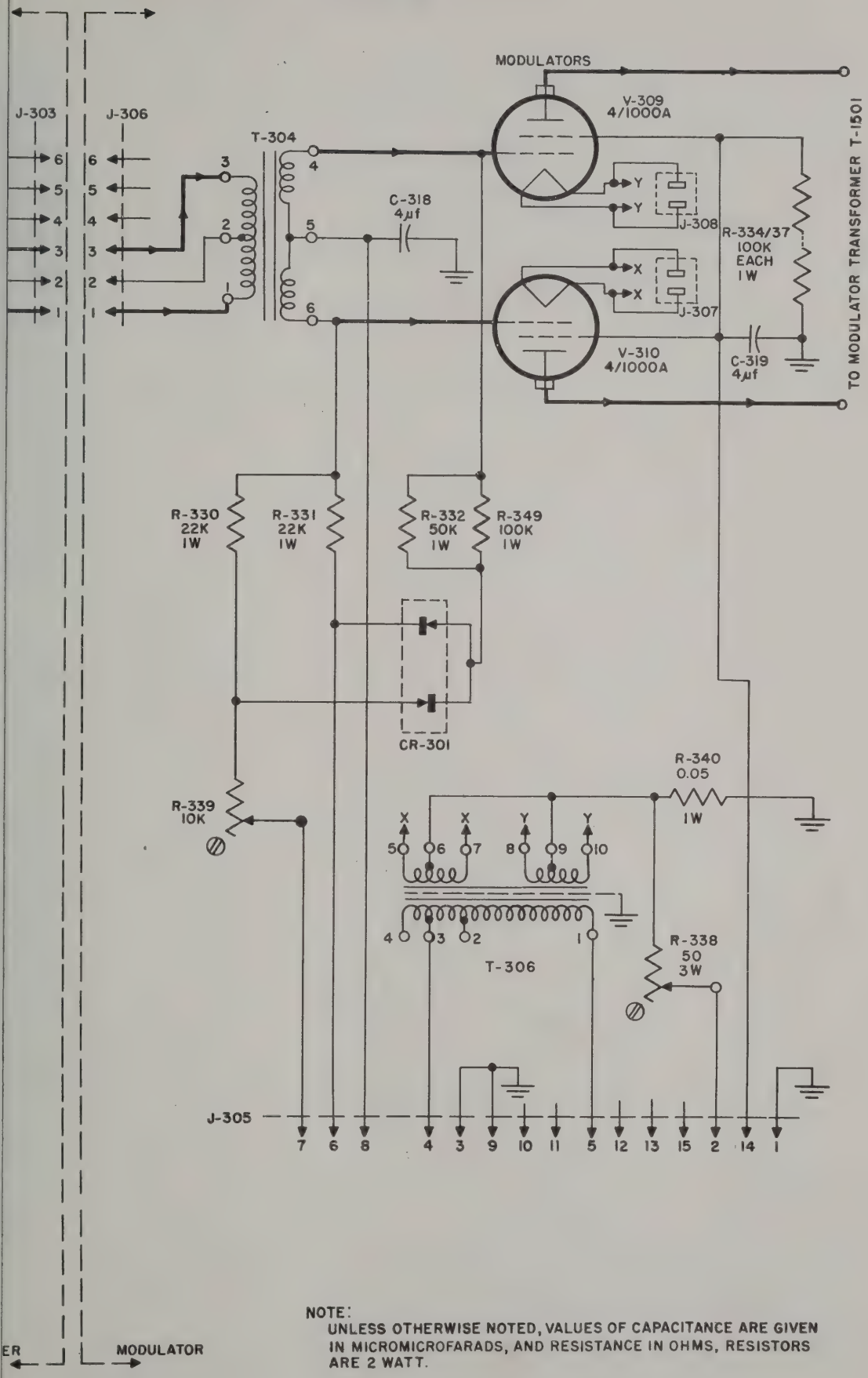


Figure 7-57. Desk Set and Telegraph Key



NOTE:
UNLESS OTHERWISE NOTED, VALUES OF CAPACITANCE ARE GIVEN IN MICROMICROFARADS, AND RESISTANCE IN OHMS, RESISTORS ARE 2 WATT.

Figure 7-58. Audio Frequency Amplifier AM-1150/FRT-15B and Modulator, Schematic

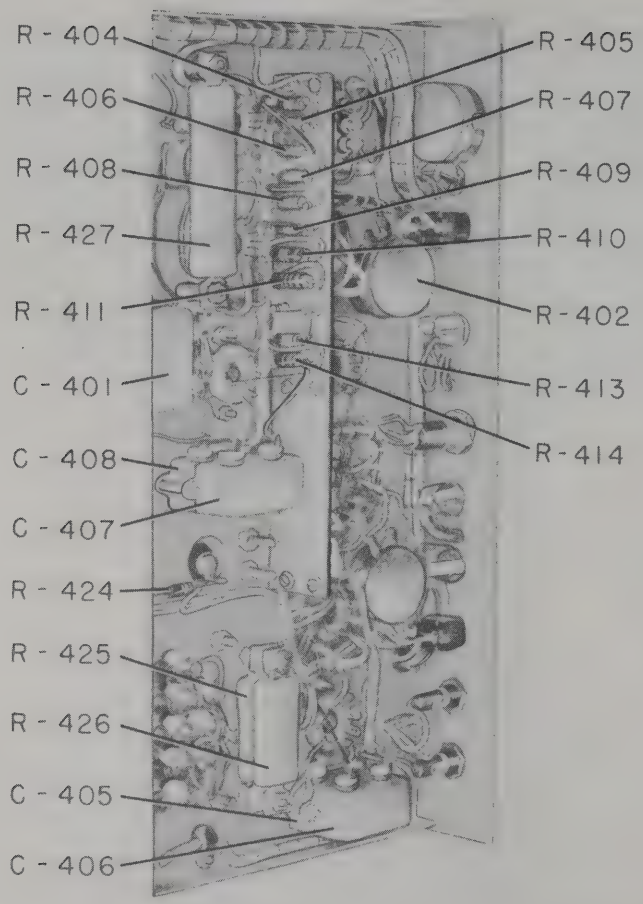


Figure 7-56. Transmitter Control C-1501/FRT-15B, View From Bottom Rear, Parts Arrangement

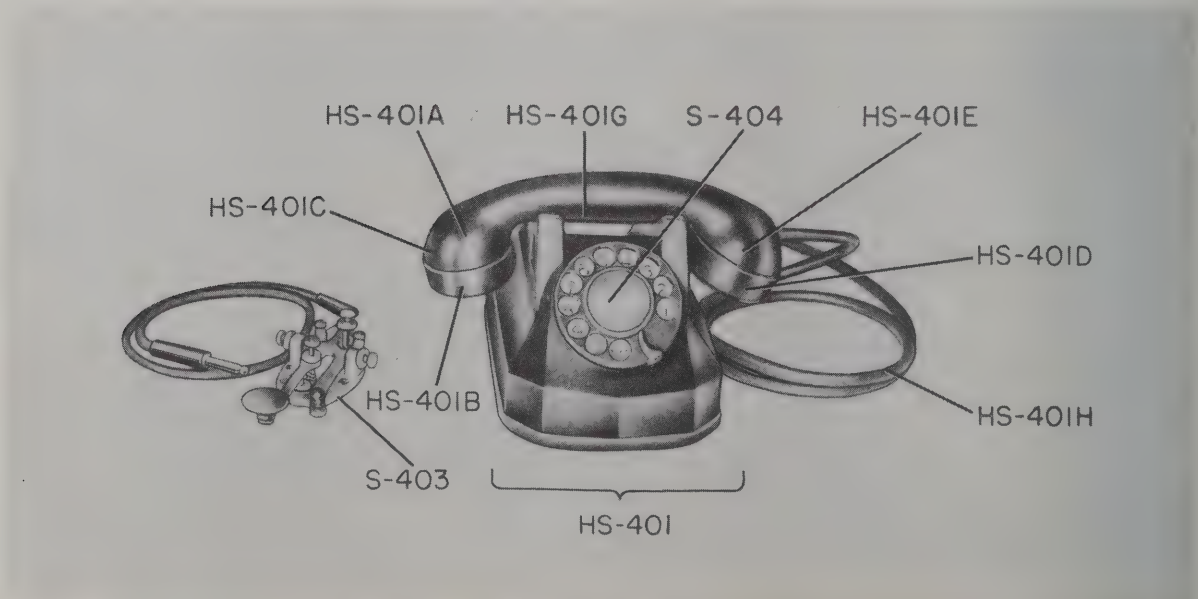


Figure 7-57. Desk Set and Telegraph Key

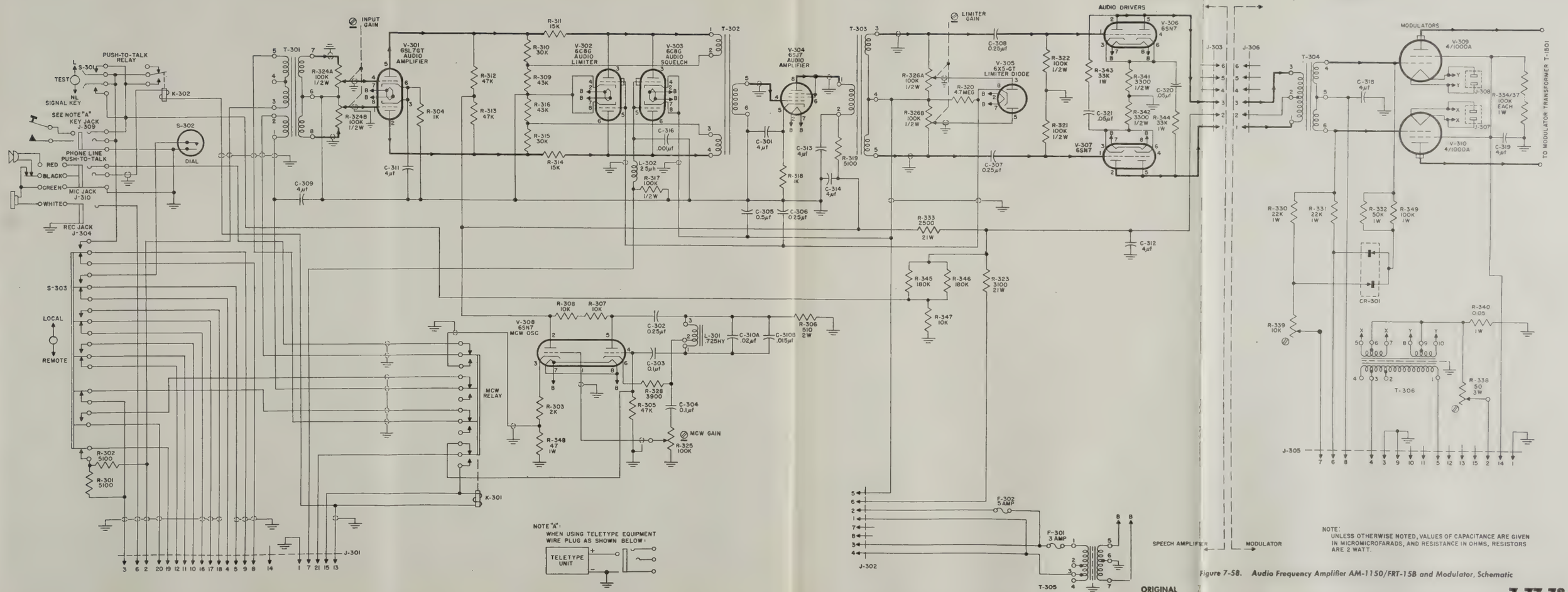
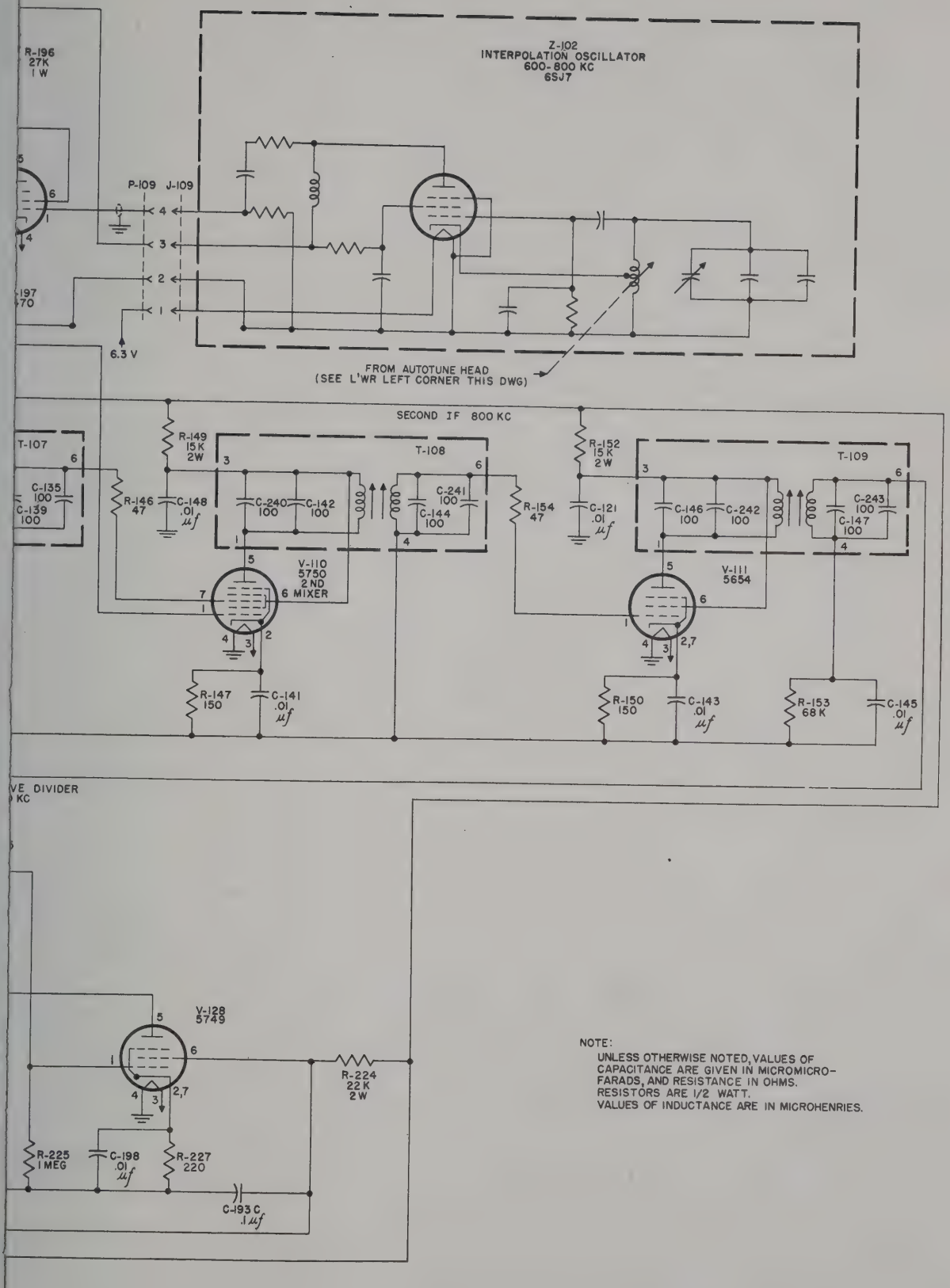


Figure 7-58. Audio Frequency Amplifier AM-1150/FRT-15B and Modulator, Schematic



NOTE:
UNLESS OTHERWISE NOTED, VALUES OF CAPACITANCE ARE GIVEN IN MICROMICRO-FARADS, AND RESISTANCE IN OHMS.
RESISTORS ARE 1/2 WATT.
VALUES OF INDUCTANCE ARE IN MICROHENRIES.

Figure 7-59. Radio Frequency Oscillator 0-317/FRT-15B, Schematic

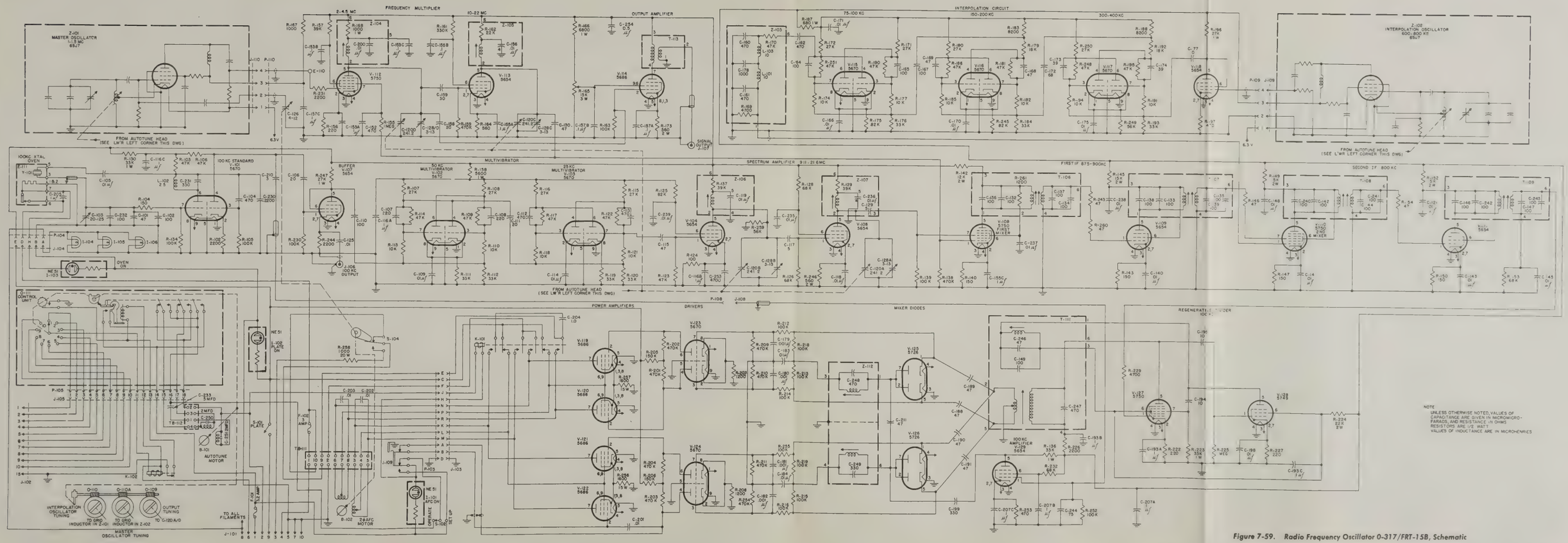


Figure 7-59. Radio Frequency Oscillator O-317/FRT-15B, Schematic

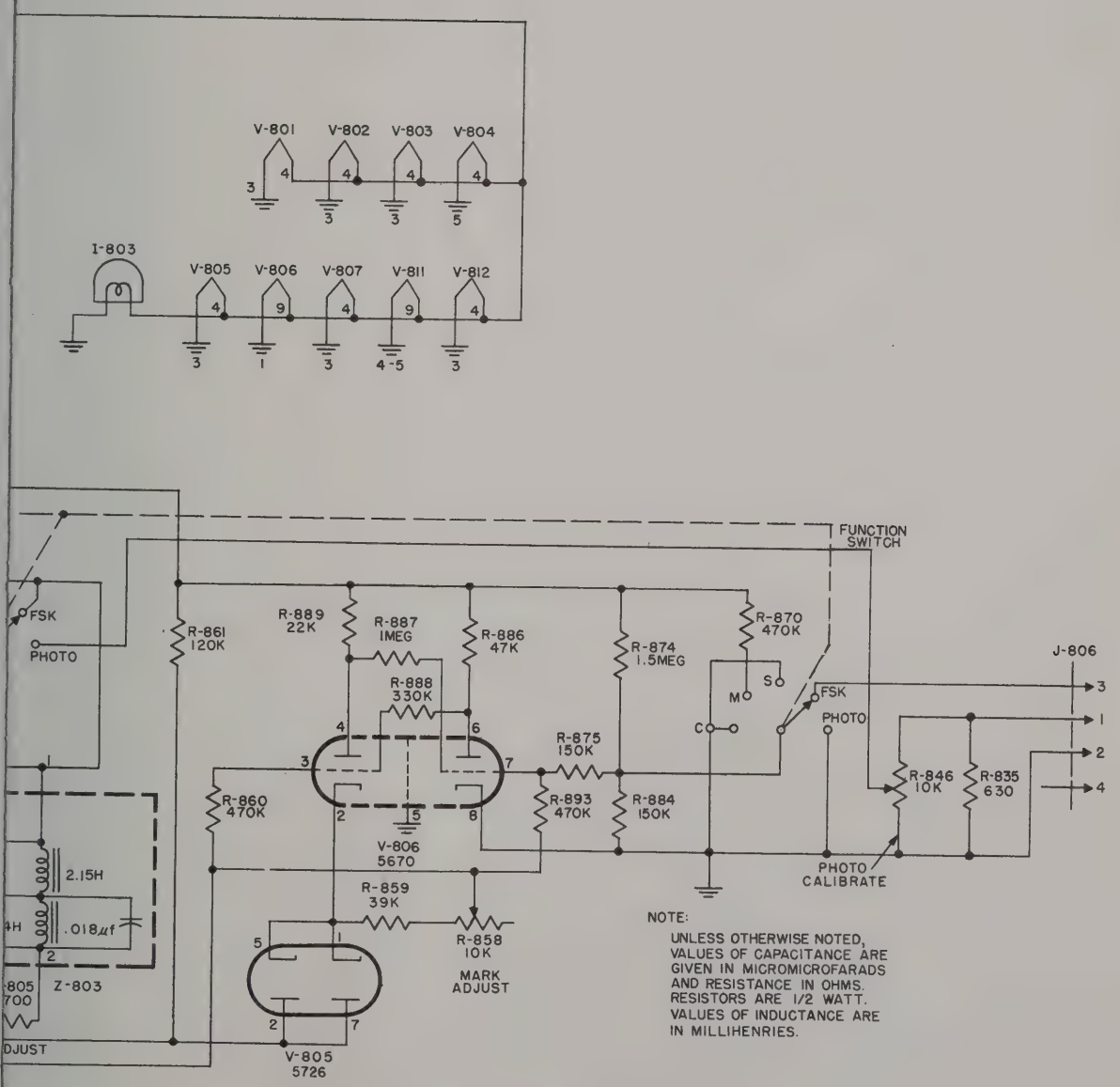


Figure 7-60. Radio Frequency Modulator MD-245/FRT-15B, Schematic

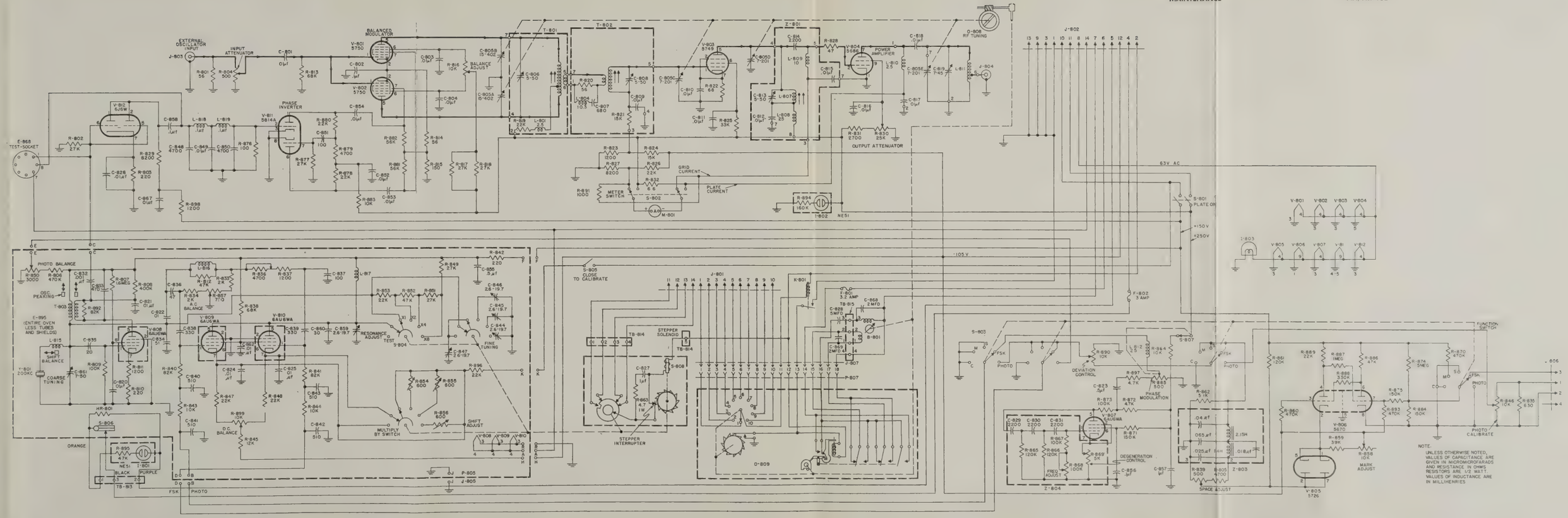
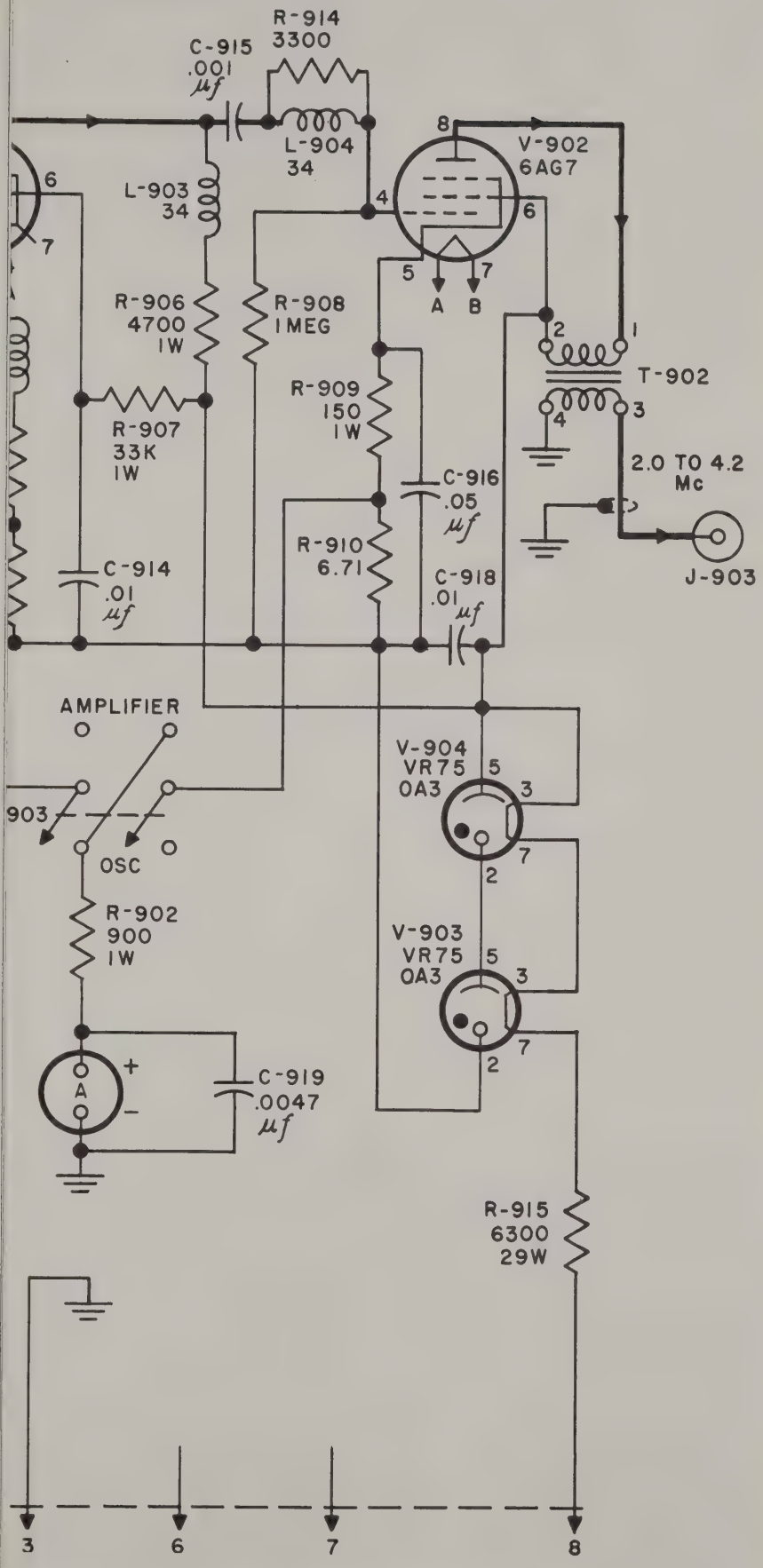
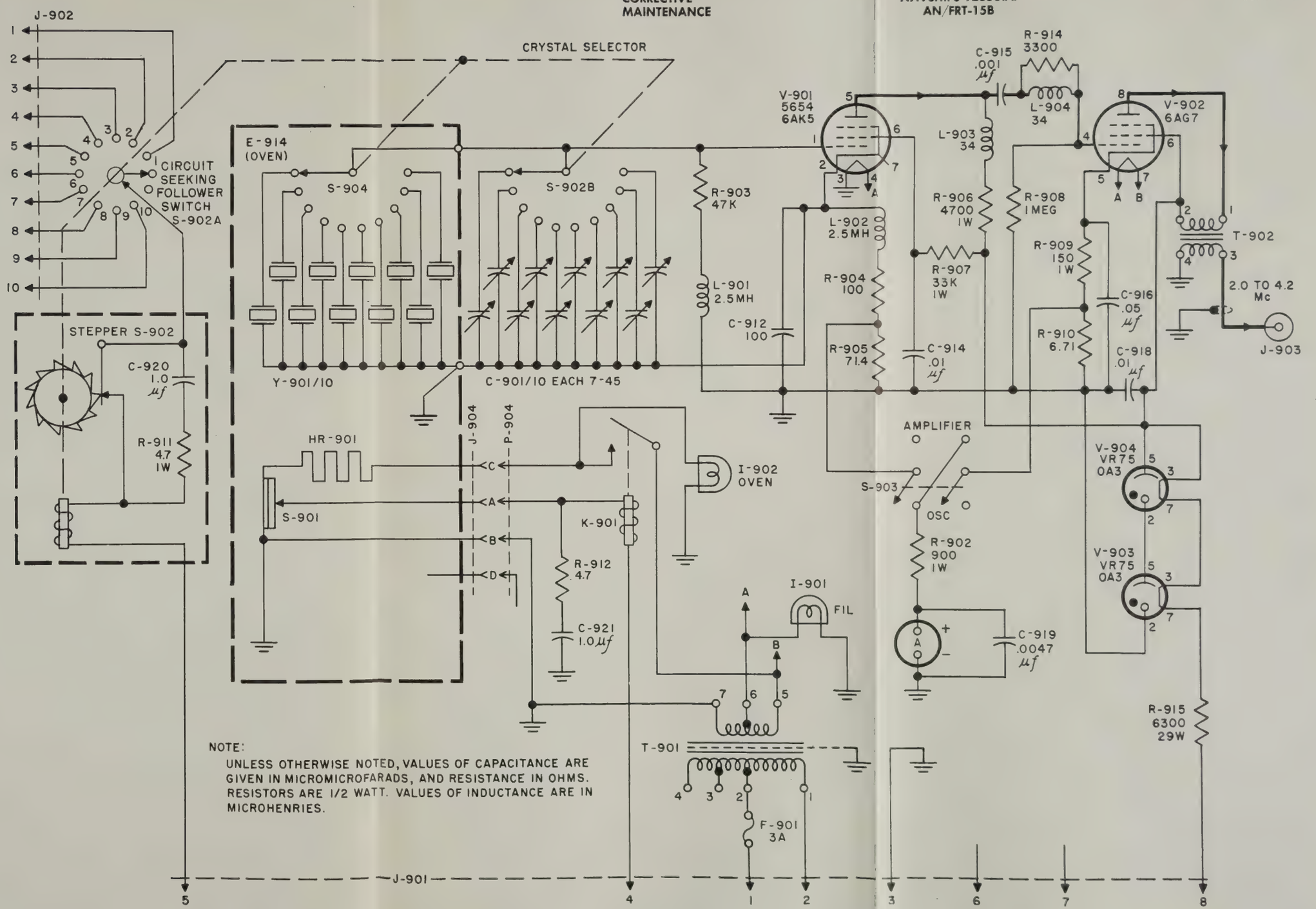


Figure 7-60. Radio Frequency Modulator MD-245/FRT-15B, Schematic

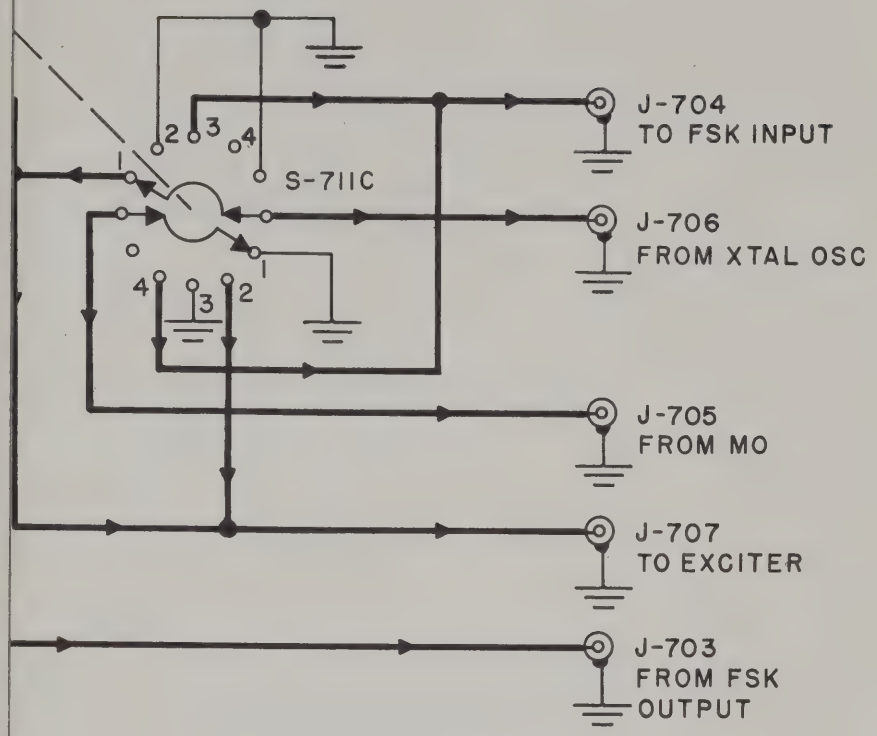


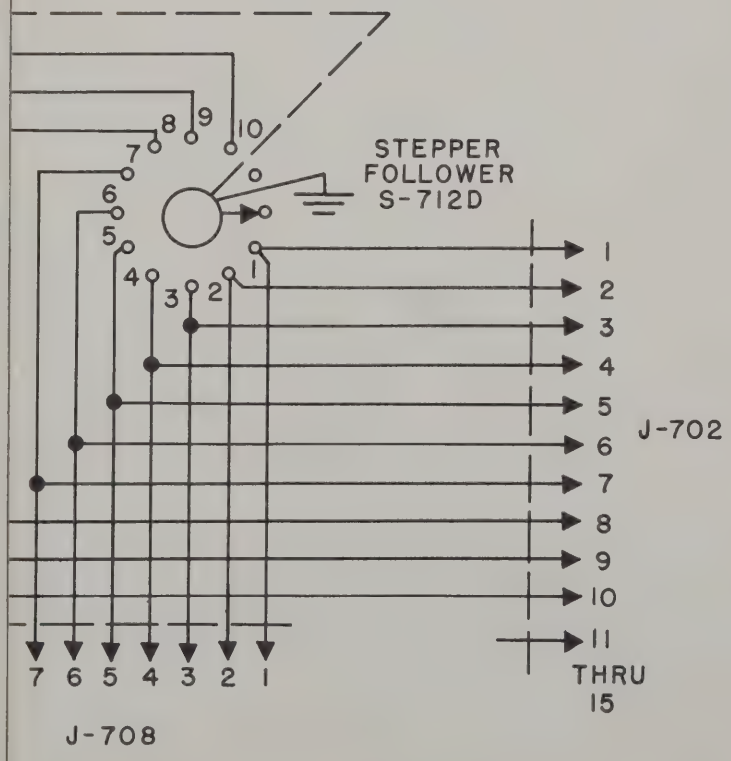
Frequency Oscillator 0-324/FRT-15B, Schematic



NOTE:
UNLESS OTHERWISE NOTED, VALUES OF CAPACITANCE ARE GIVEN IN MICROMICROFARADS, AND RESISTANCE IN OHMS. RESISTORS ARE 1/2 WATT. VALUES OF INDUCTANCE ARE IN MICROHENRIES.

Figure 7-61. Radio Frequency Oscillator O-324/FRT-15B, Schematic





7-62. Excitation Control, Schematic

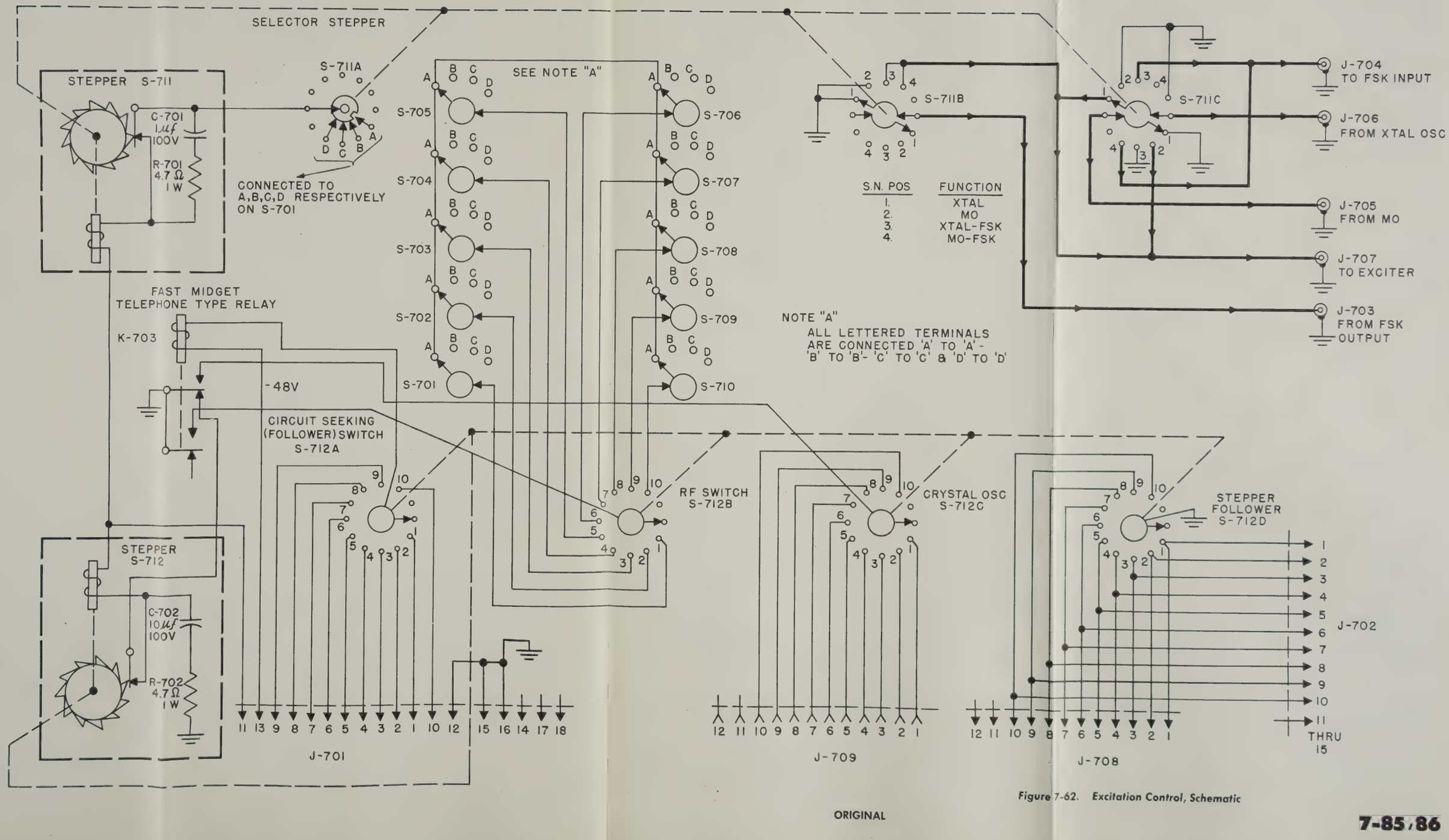
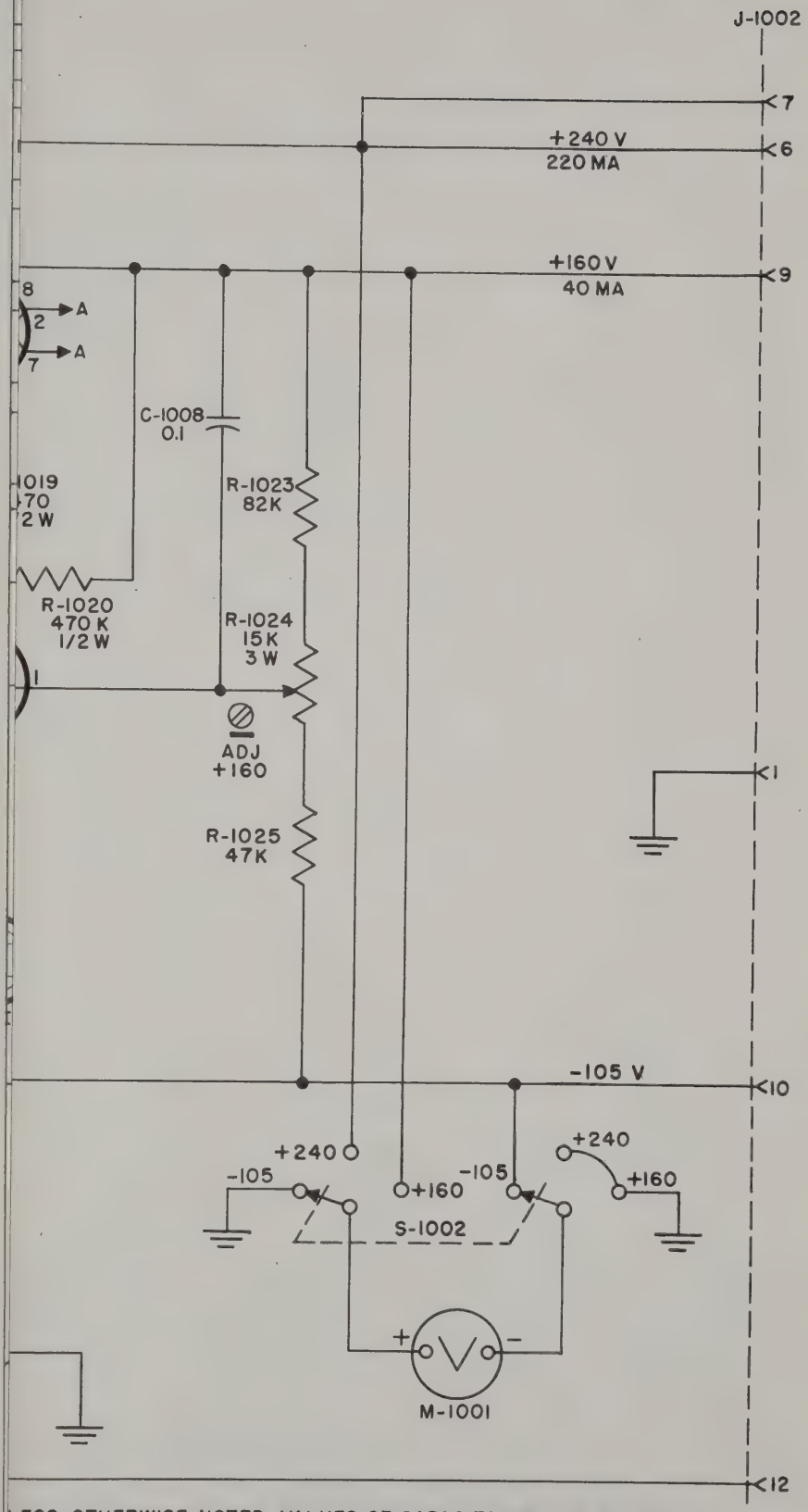
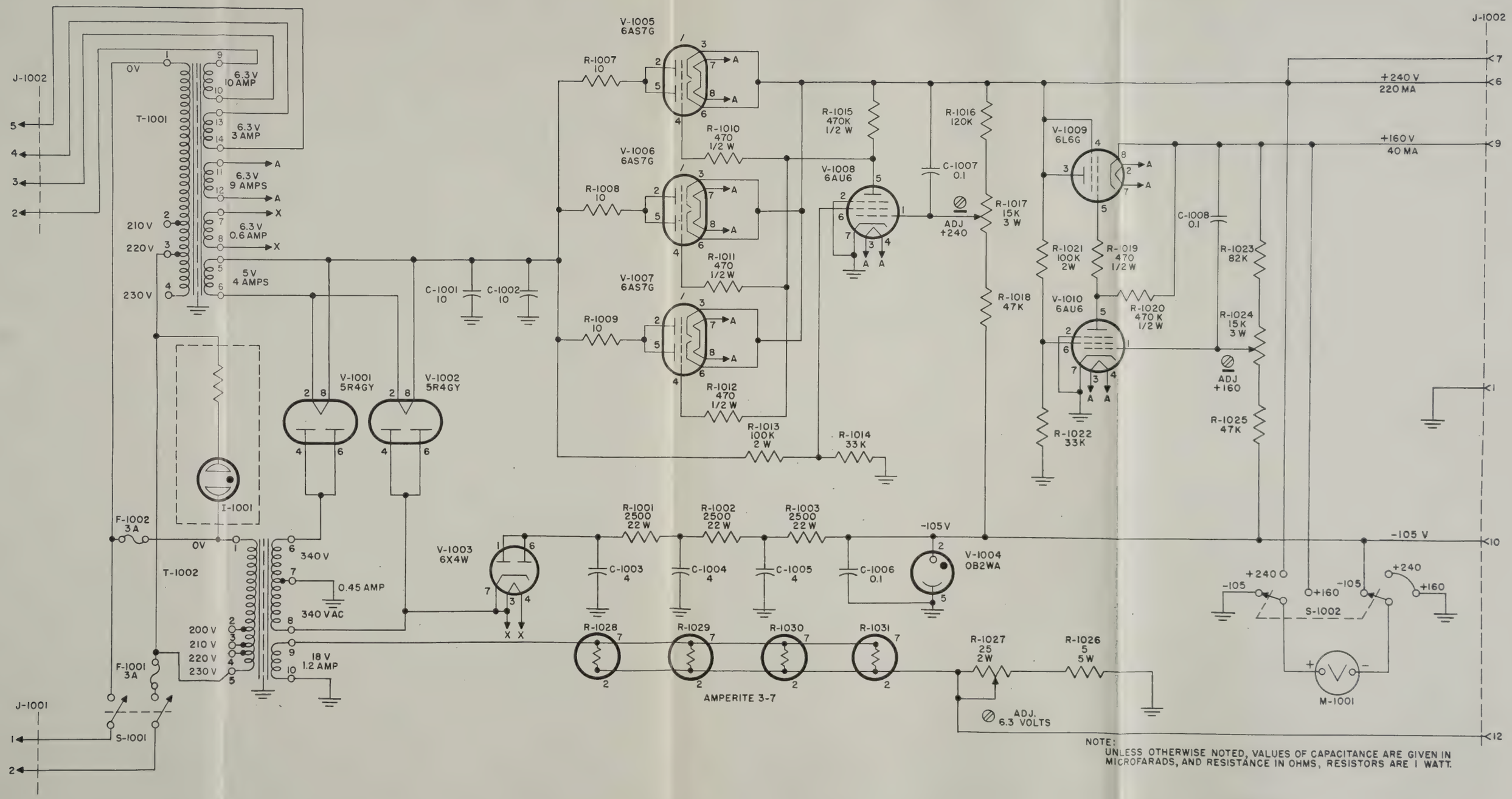


Figure 7-62. Excitation Control, Schematic



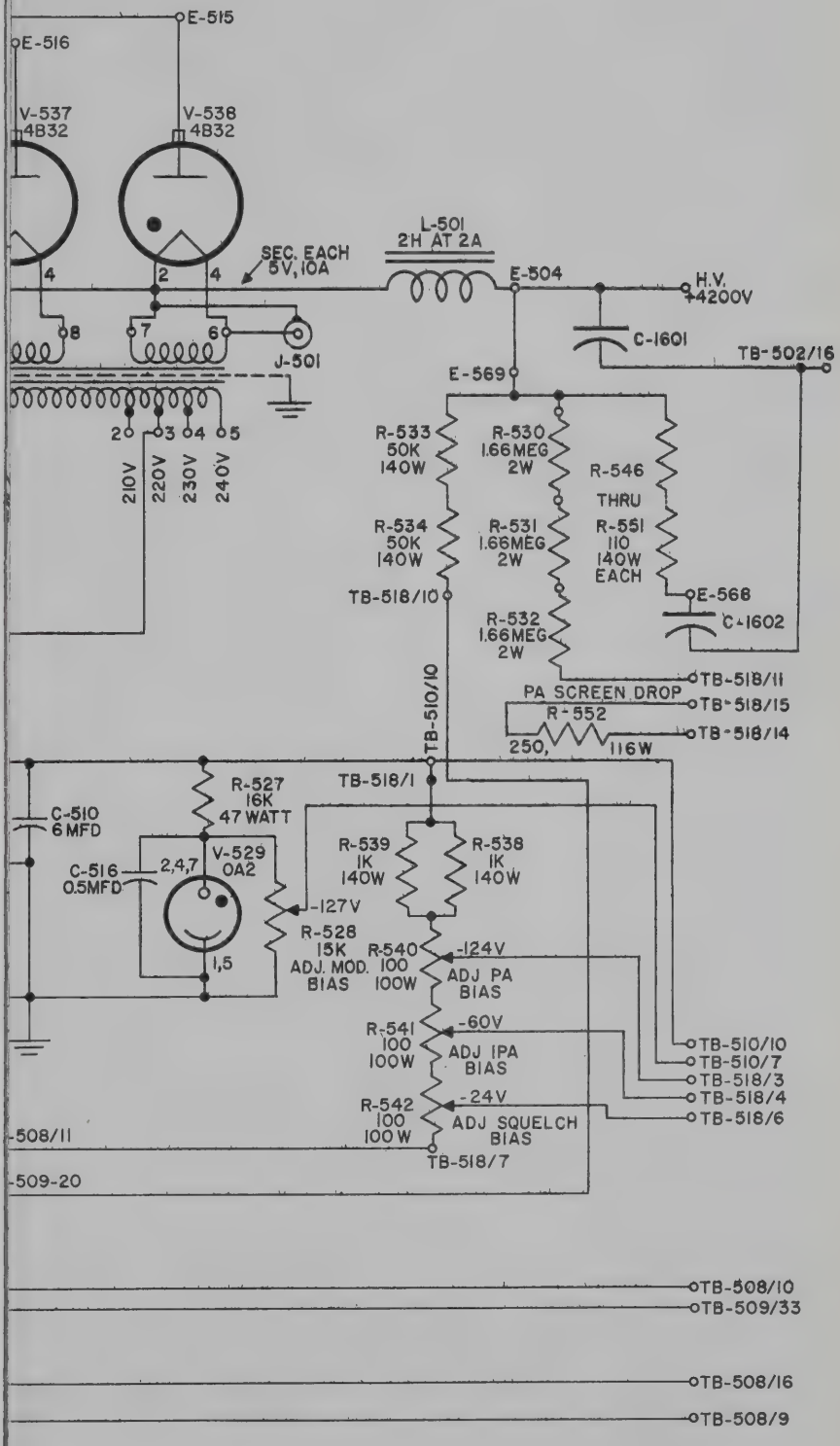
LESS OTHERWISE NOTED, VALUES OF CAPACITANCE ARE GIVEN IN
CROFARADS, AND RESISTANCE IN OHMS, RESISTORS ARE 1 WATT.

Power Supply PP-1197/FRT-15B, Schematic

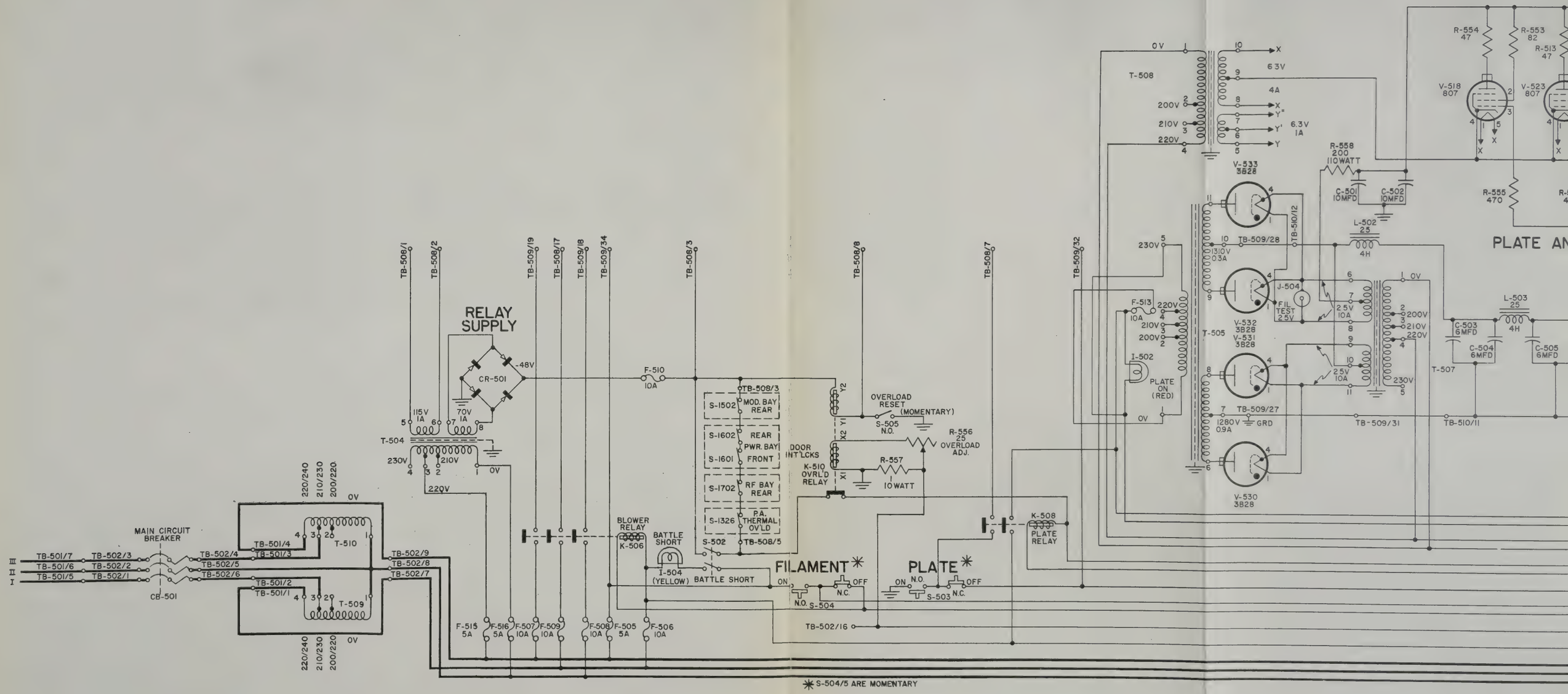


NOTE:
UNLESS OTHERWISE NOTED, VALUES OF CAPACITANCE ARE GIVEN IN MICROFARADS, AND RESISTANCE IN OHMS, RESISTORS ARE 1 WATT.

Figure 7-63. Power Supply PP-1197/FRT-15B, Schematic



Supply Assembly PP-1198/FRT-15B, Schematic


RELAY SUPPLY
CR-501
-48V
T-504
115V 1A
70V 1A
230V
210V
220V
0V
F-510 10A
TB-508/1
TB-508/2
TB-509/19
TB-508/17
TB-509/18
TB-509/34
TB-508/3
TB-508/8
TB-508/7
TB-509/32
S-1502 MOD. BAY REAR
S-1602 REAR PWR. BAY
S-1601 FRONT
S-1702 RF BAY REAR
S-1326 P.A. THERMAL OV'LD
S-502
TB-508/5
OVERLOAD RESET (MOMENTARY)
S-505 N.O.
R-556 25 OVERLOAD ADJ.
R-557 10 WATT
DOOR INT'LCKS
K-510 OVRL'D RELAY
X1 X2 Y1 Y2
BLOWER RELAY K-506
BATTLE SHORT
I-504 (YELLOW) BATTLE SHORT
FILAMENT *
PLATE *
ON N.O. OFF N.C.
S-504
S-503
K-508 PLATE RELAY
TB-502/16
MAIN CIRCUIT BREAKER
CB-501
III II I
TB-501/7 TB-502/3
TB-501/6 TB-502/2
TB-501/5 TB-502/1
TB-502/4 TB-502/5 TB-502/6
TB-501/4 TB-501/3 TB-501/2 TB-501/1
T-510
T-509
220/240 210/230 200/220
TB-502/9 TB-502/8 TB-502/7
F-515 5A
F-516 5A
F-507 10A
F-509 10A
F-508 10A
F-505 5A
F-506 10A
T-508
0V
200V
210V
220V
6.3V 4A
6.3V 1A
X
Y"
Y'
Y
V-533 3B28
V-532 3B28
V-531 3B28
V-530 3B28
R-558 200 110WATT
C-501 10MFD
C-502 10MFD
L-502 25 4H
TB-509/28
TB-510/12
1310V 0.3A
J-504
FIL TEST 2.5V
2.5V 10A
T-505
I-502
PLATE ON (RED)
F-513 10A
TB-509/27
1280V 0.9A
GRD
TB-509/31
R-554 47
R-553 82
R-513 47
V-518 807
V-523 807
R-555 470
L-503 25 4H
C-503 6MFD
C-504 6MFD
C-505 6MFD
T-507
TB-510/11
PLATE AN
* S-504/5 ARE MOMENTARY

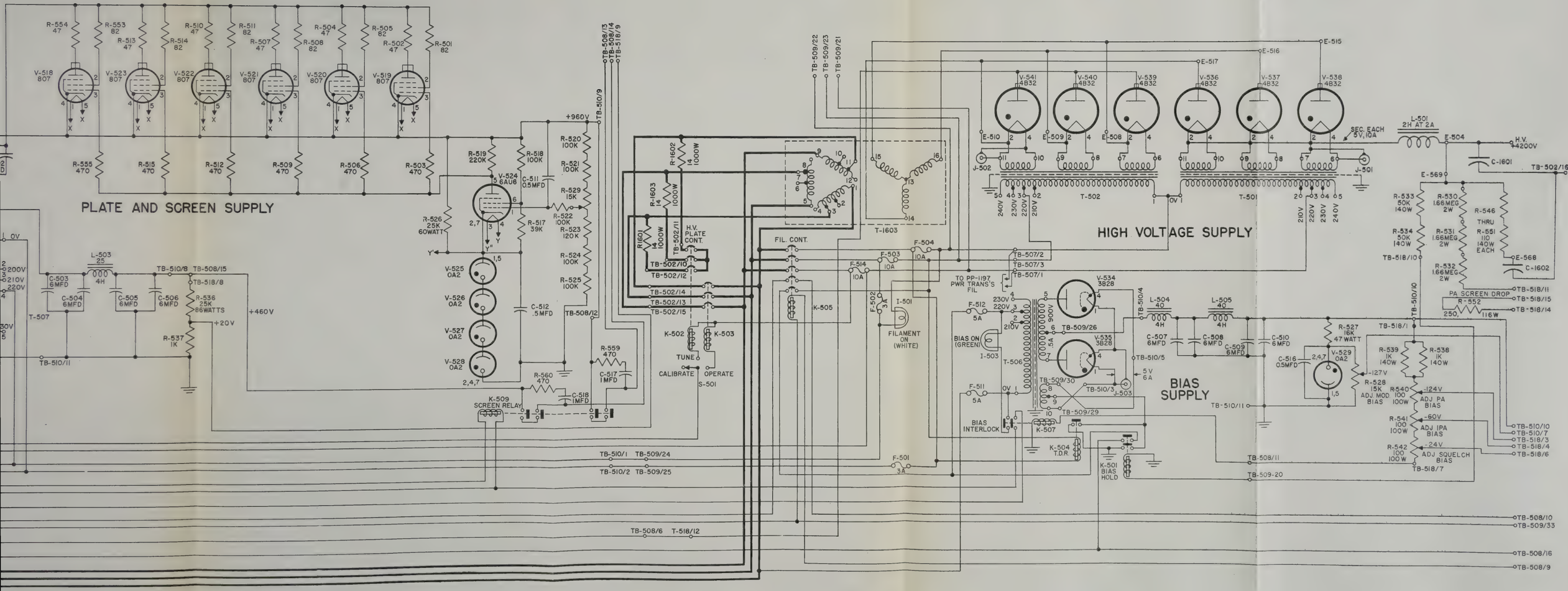
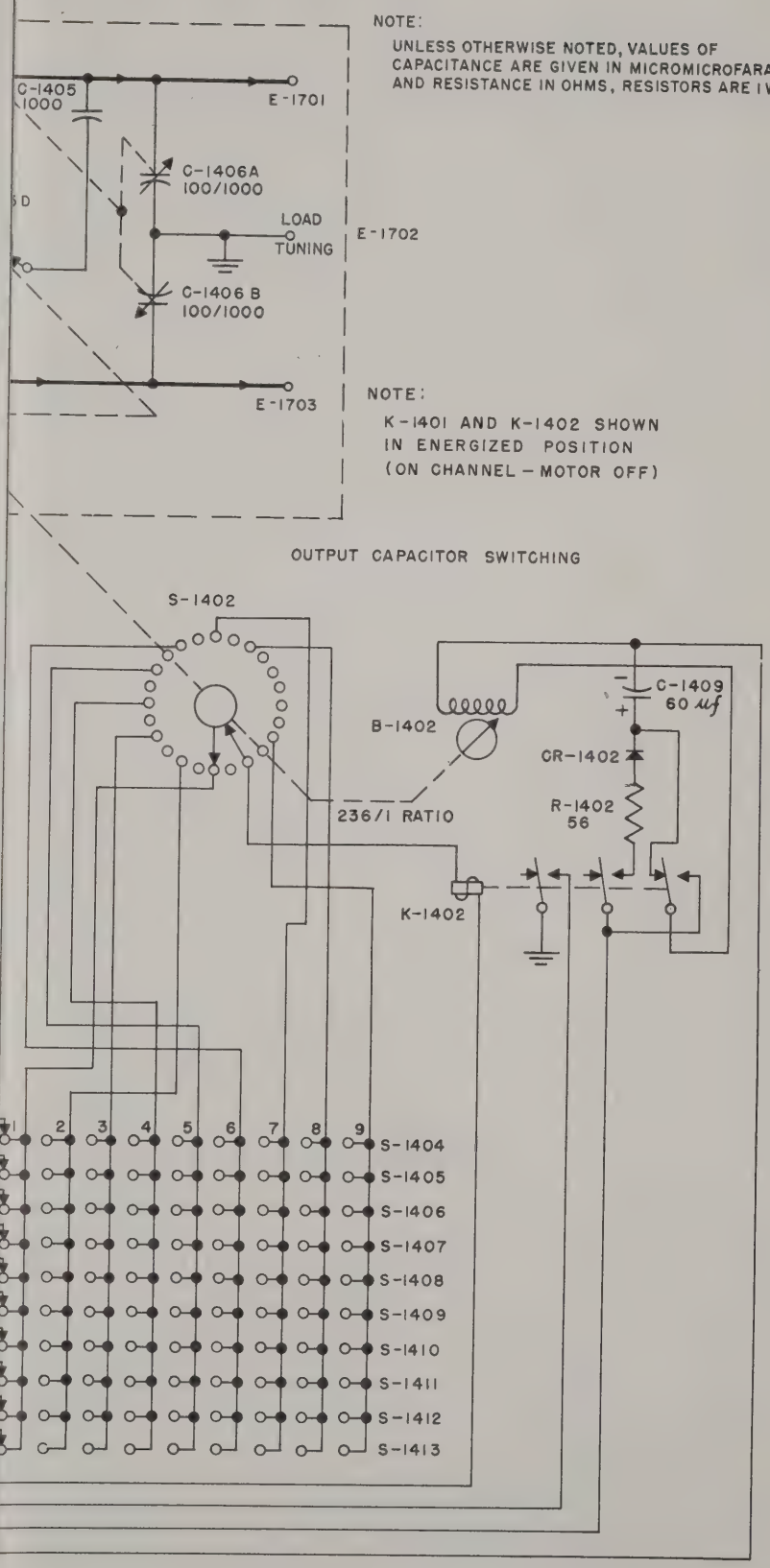


Figure 7-64. Power Supply Assembly PP-1198/FRT-15B, Schematic



Antenna Matching Network, Schematic

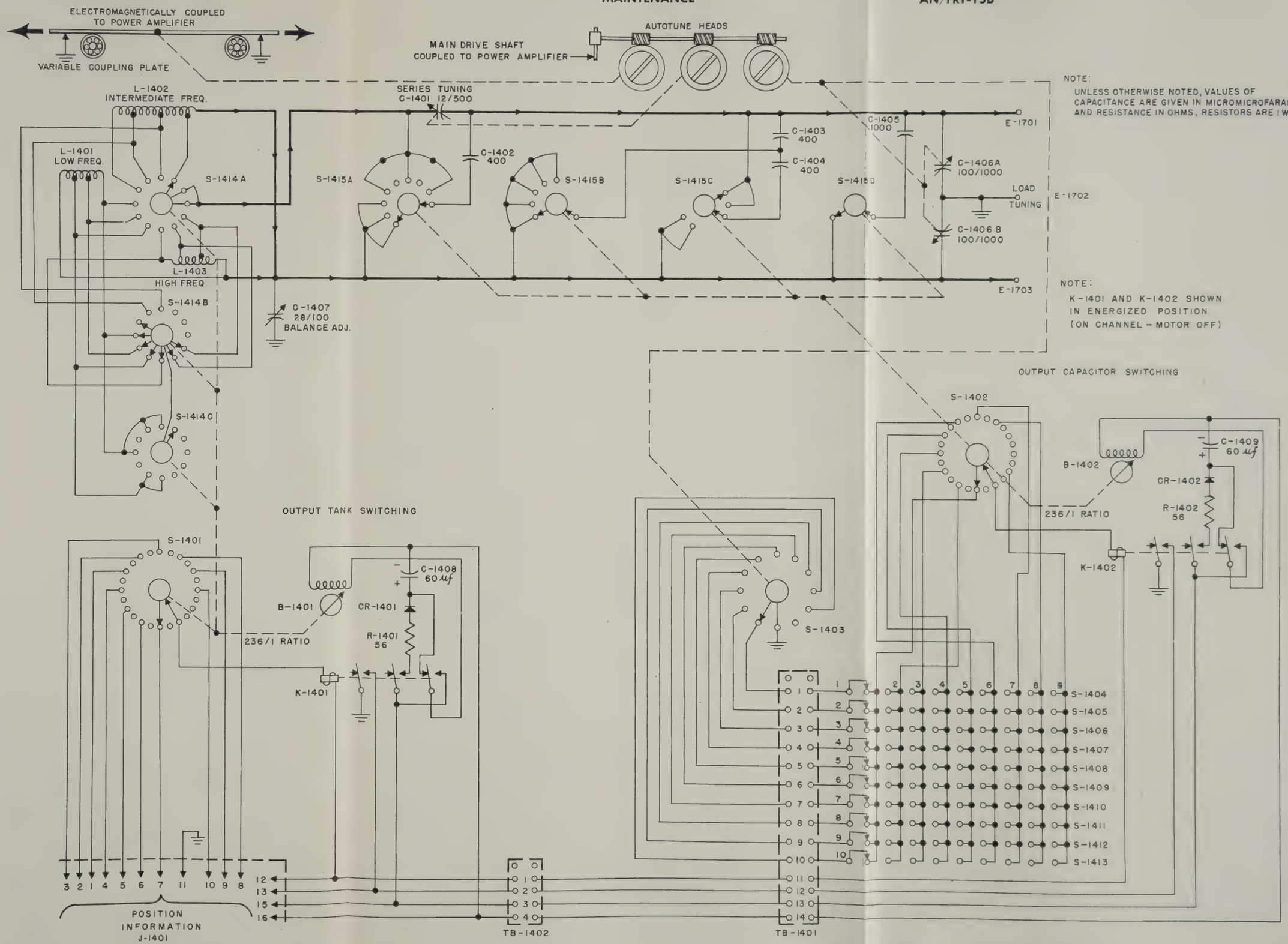
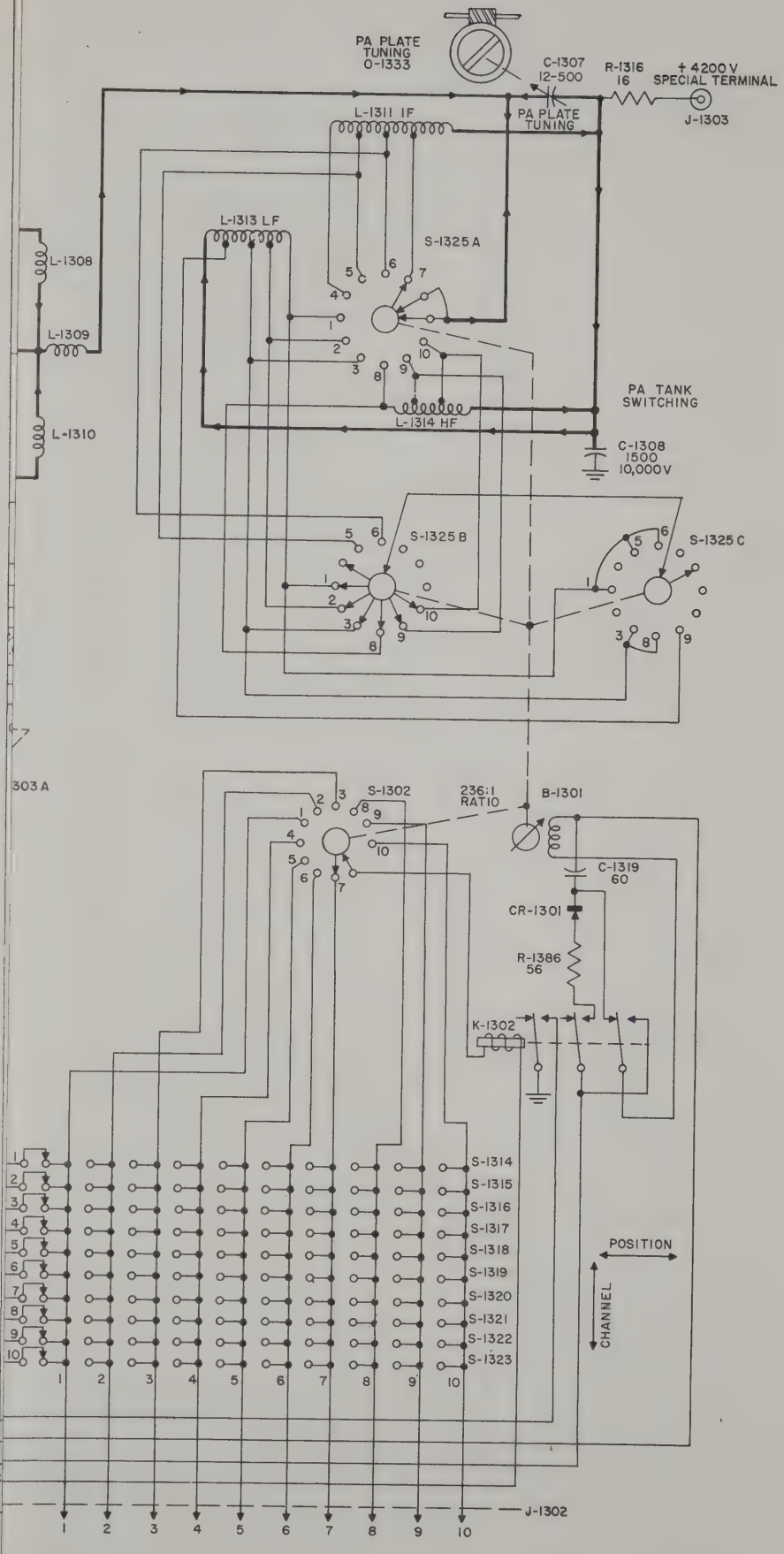


Figure 7-65. Antenna Matching Network, Schematic



7-66. *Power Amplifier, Schematic*

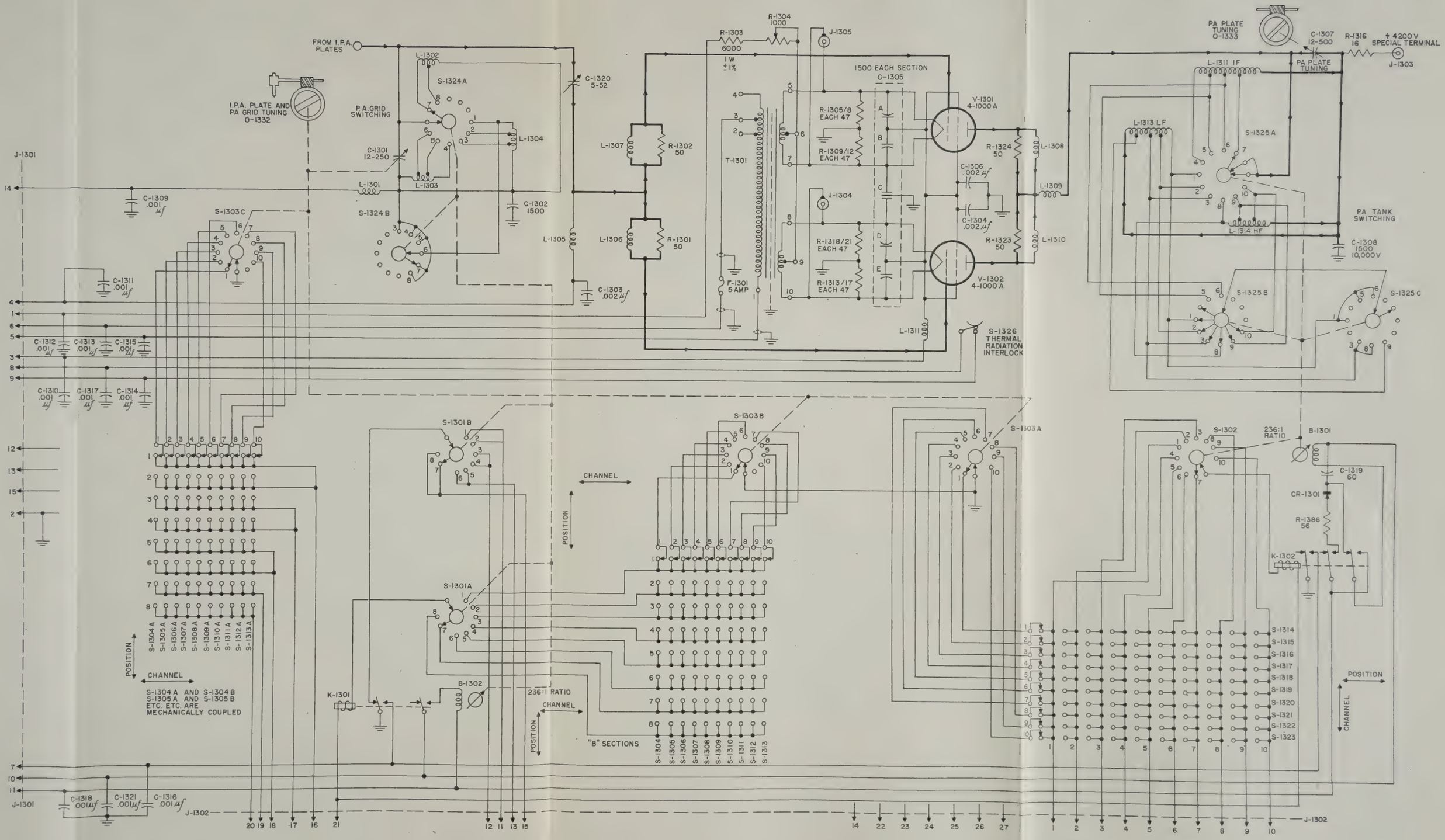


Figure 7-66. Power Amplifier, Schematic

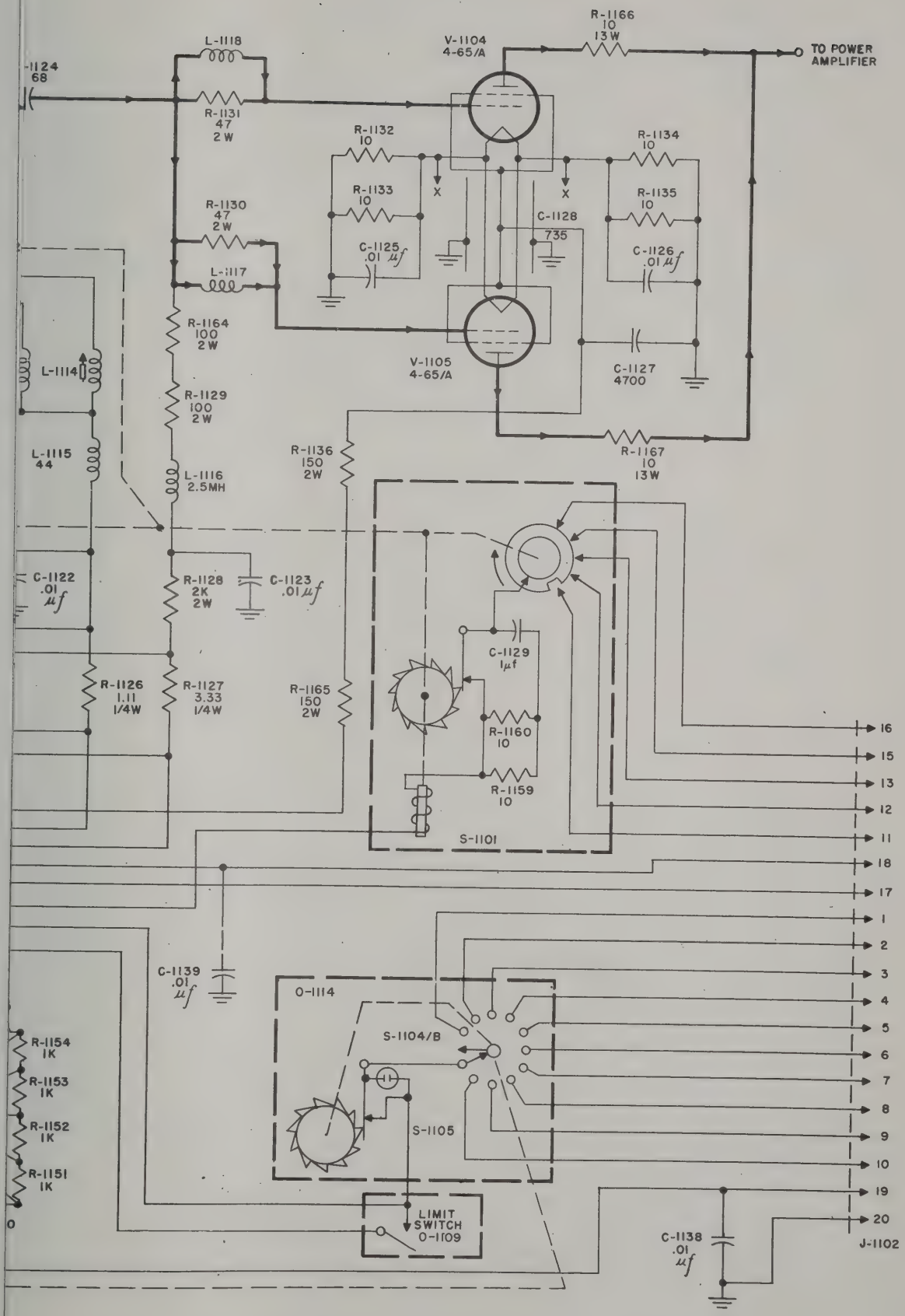


Figure 7-67. Exciter—IPA, Schematic

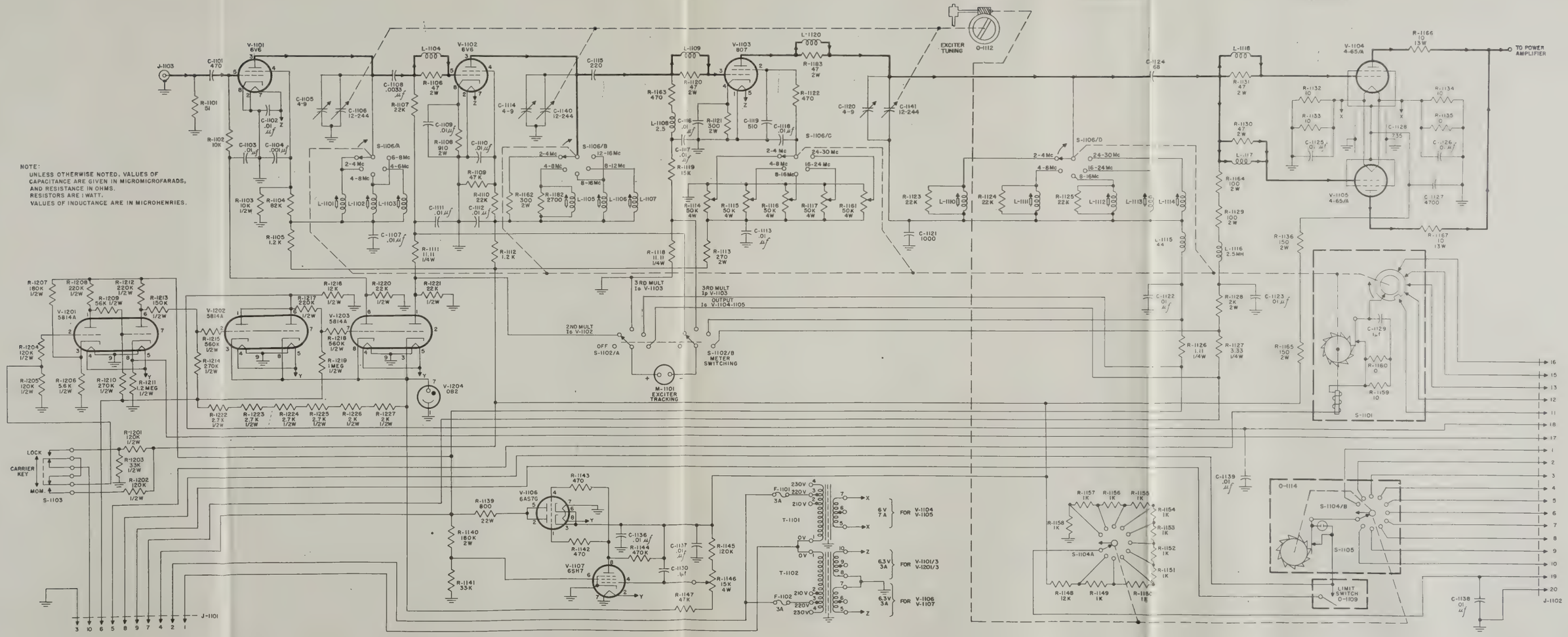
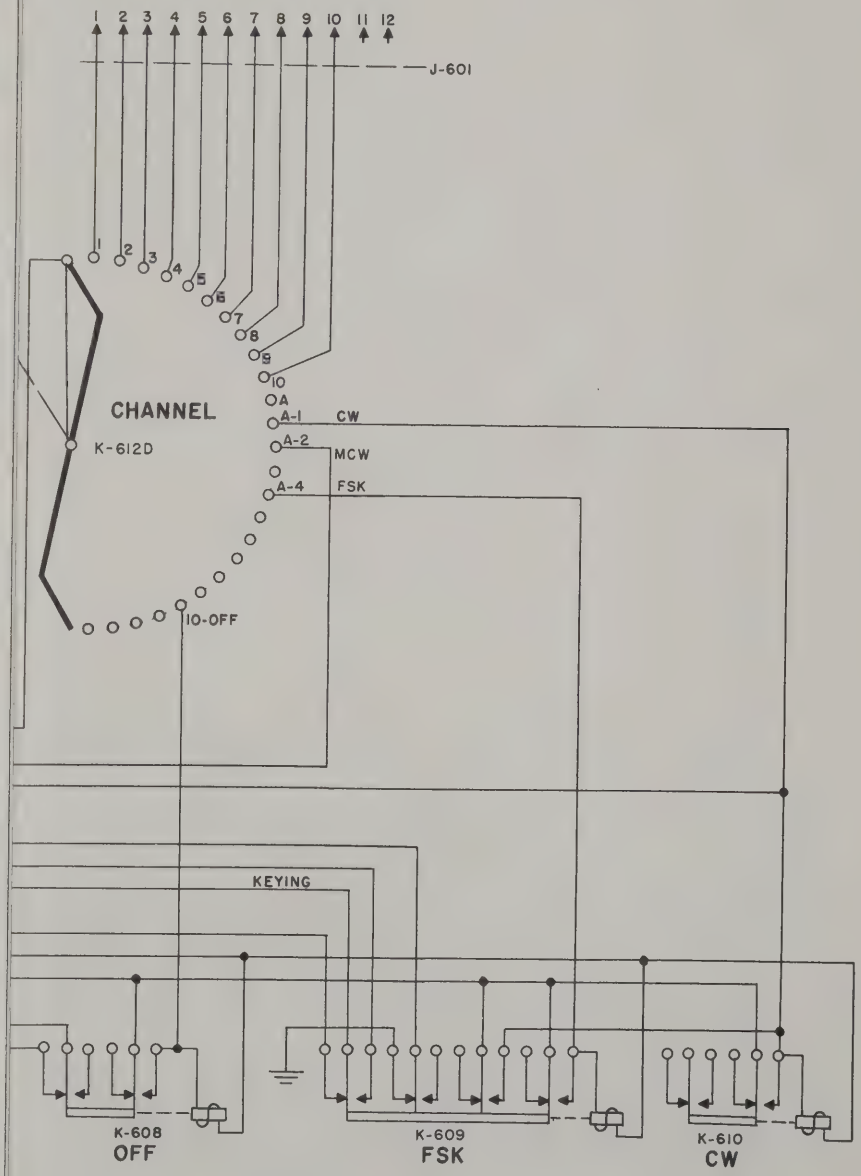


Figure 7-67. Exciter—IPA, Schematic



8. *Automatic Control, Schematic*

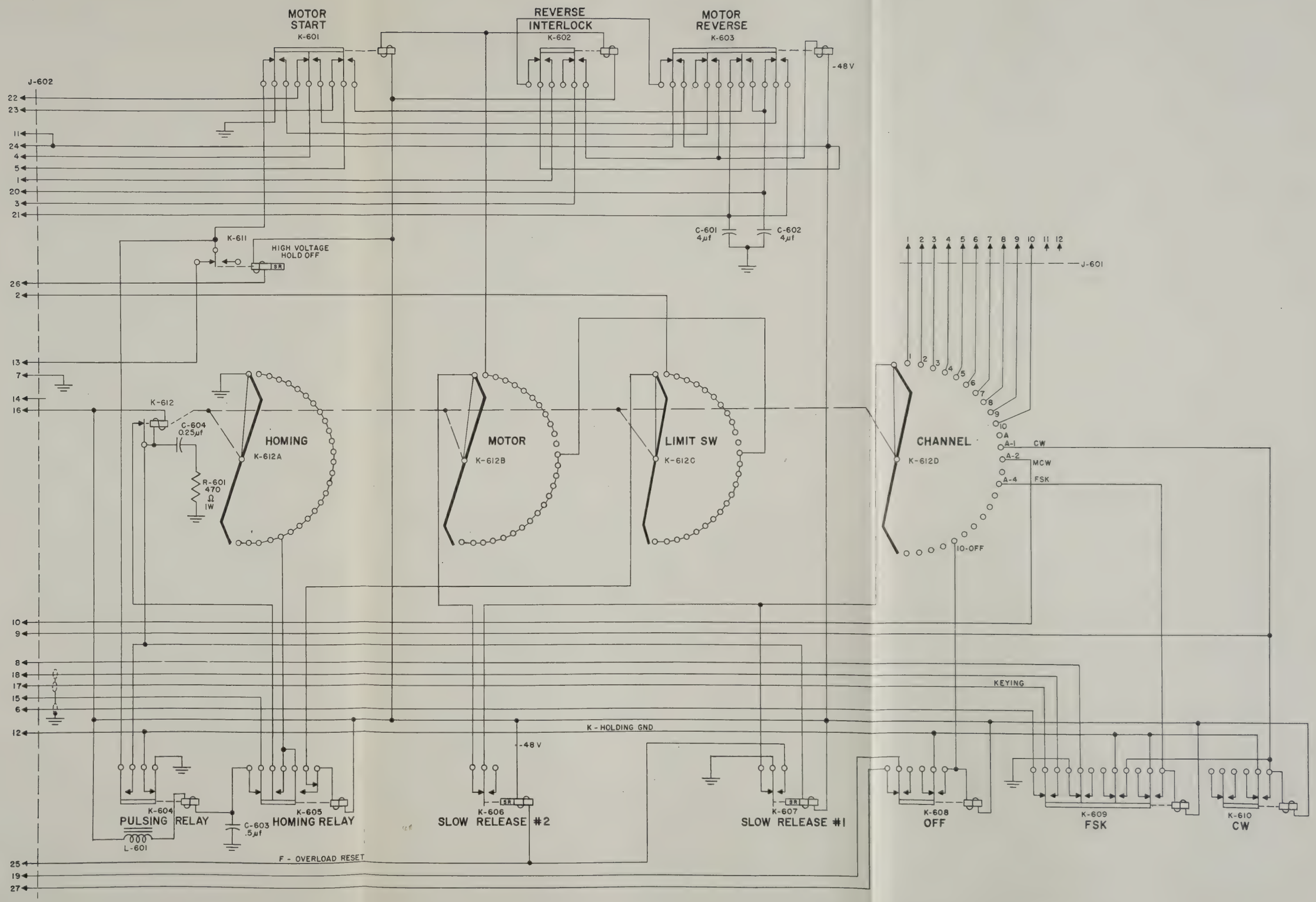


Figure 7-68. Automatic Control, Schematic

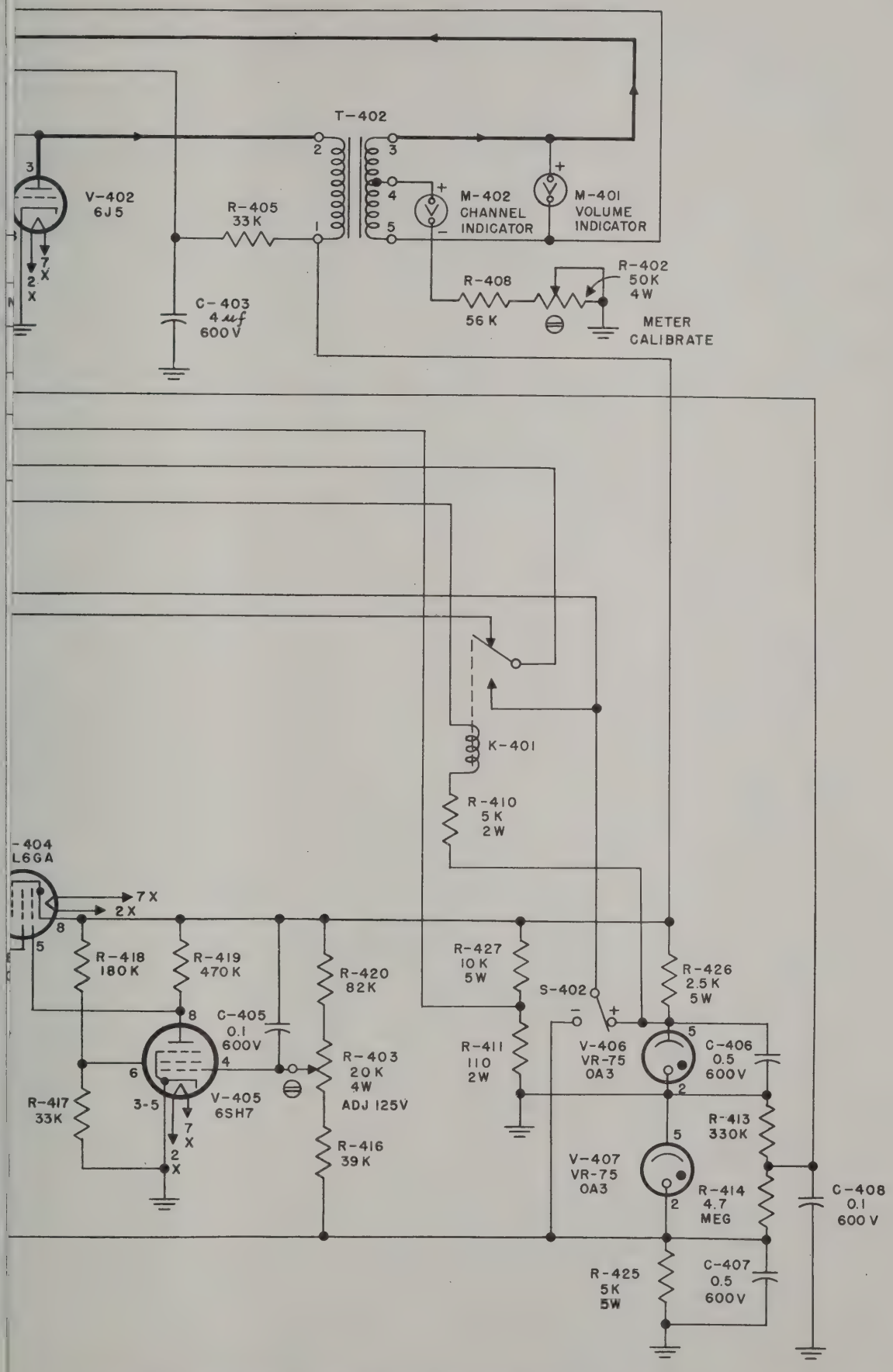


Figure 7-69. Transmitter Control C-1501/FRT-15B, Schematic

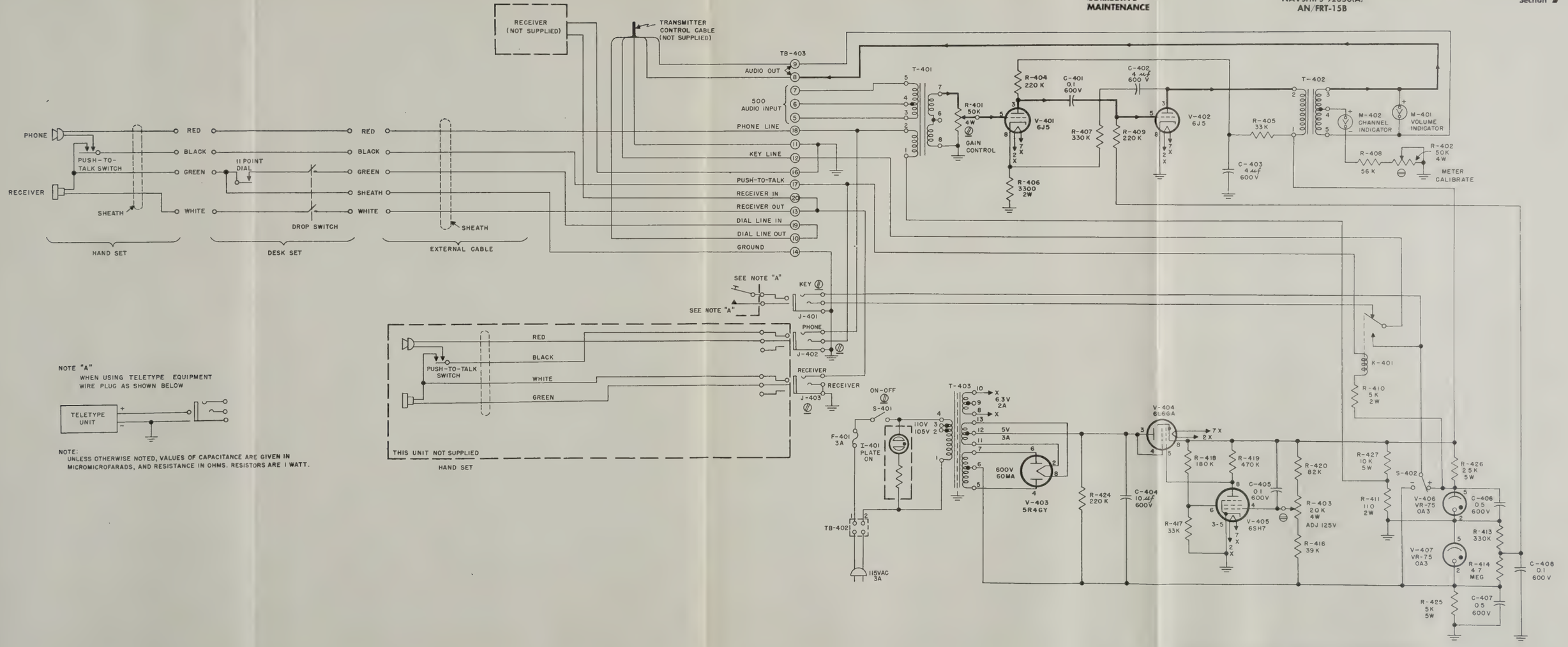


Figure 7-69. Transmitter Control C-1501/FRT-15B, Schematic

SECTION 8
PARTS LIST

1. INTRODUCTION.

Reference designations (previously referred o as circuit symbol, reference symbol, etc.) ıave been assigned to identify all maintenance ›arts of the equipment. They are used for narking the equipment (adjacent to the part hey identify) and are included on drawings, liagrams, and the parts list. The letters of a ·eference designation indicate the kind of part generic group) such as resistor, capacitor, electron tube, etc. The number differentiates ›etween parts of the same generic group. Parts ›f the first major unit are numbered from 1 to 199; parts of the second from 201 to 299, etc. Two consecutive series of numbers have been ıssigned to major units in which there are more :han one hundred parts of the same generic group. Sockets associated with a particular plug-in device, such as an electron tube, are ndentified by a reference designation which in-:ludes the reference designation of the plug-in levice. For example, the socket for electron :ube V-101 is designated XV-101.

2. MAINTENANCE PARTS LIST.

Table 8-2 lists all major units and their maintenance parts. Parts for each major unit are grouped together.

Column 1 lists the reference series of each major unit followed by the reference designation of the various parts in alphabetical and numerical sequence.

Column 2 includes a reference to the explanatory notes that appear in paragraph 5. below.

Column 3 includes the name and description of the various items. Complete information is provided for all key parts (a part that differs from any part previously listed in the table). The name and description is omitted for other parts, however, reference is made to the key part for the required data.

Column 4 indicates how the part is used and provides its functional location in the equipment.

3. STOCK NUMBER IDENTIFICATION.

Table 8-3 gives stock numbers for items listed in Table 8-2.

4. LIST OF MANUFACTURERS.

Table 8-4 lists manufacturers of parts used in the equipment. The prefix letters are those assigned by the Bureau of Ships to identify the manufacturers, on identification plates (nameplates) and on small parts.

5. NOTES.

The following provide additional information about items listed in Table 8-2.

A. Fabricate locally from bulk material having the stock number listed in Table 8-3.

B. Manufacture in a Navy Shop.

C. Will be procured on demand by the nearest Naval Shore Supply Activity.

D. Non-replaceable in this application. Listed for reference only.

E. Replace by adapting or modifying the standard item having the stock number listed in Table 8-3. Modify as indicated in the description.

F. Replace with the substitute part having the stock number listed in Table 8-3.

G. Assumed to be a non-failing item. If failure occurs, order replacement from ESO, referencing NavShips 900, 180A.

TABLE 8-1. LIST OF MAJOR UNITS

SYMBOL GROUP	QUANTITY	NAME OF MAJOR UNIT	NAVTYPE DESIGNATION
101-299	1	Radio Frequency Oscillator	O-317/FRT-15B
301-399	1	Audio Frequency Amplifier - (and Modulator)	AM-1150/FRT-15B
401-499	2	Transmitter Control	C-1501/FRT-15B
501-599	1	Power Supply Assembly	PP-1198/FRT-15B
601-699	1	Autotune Control	
701-799	1	Excitation Control	
801-899	1	Radio Frequency Modulator	MD-245/FRT-15B
901-999	1	Radio Frequency Oscillator	O-324/FRT-15B
1001-1099	1	Power Supply	PP-1197/FRT-15B
1101-1199	1	Exciter-I. P. A.	
1201-1299	1	Keyer (p/o Exciter-I. P. A. chassis)	
1301-1399	1	Power Amplifier	
1401-1499	1	Antenna Matching Network	
1501-1599	1	Modulator - Oscillator Group	OA-745/FRT-15B
1601-1699	1	Power Supply Bay	
1701-1799	1	Radio Frequency Amplifier	AM-1116/FRT-15B

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
		TRANSMITTER, RADIO AN/FRT-15B: A-1, 2, 3, 4 emission; automatic tuning; 10 bands, 10 channels each 2-30 Mc; crystal and master oscillator frequency control; phone or CW 3000 W from 2-12 Mc, 2500 W from 12-26 Mc, 2000 W from 26-30 Mc; requires 220 V, 50/60 cps, 3 phase; steel cabinet enclosures; 84 in. h, 84 in. w, 31 in. d; floor mtd; includes Modulator-Oscillator Group OA-745/FRT-15B, Radio Frequency Amplifier AM-1116/FRT-15B, Power Supply assembly PP-1198/FRT-15B, Control Transmitter (two) C-1501/FRT-15B; MIL-R-15236 (SHIPS); CBIK Dwg No. 3893	Overall equipment
		MODULATOR-OSCILLATOR, GROUP OA-745/FRT-15B: p/o Transmitter Radio AN/FRT-15B; 84 in. h, 29 in. w, 31 in. d; floor mtd; supplies signal sources plus modulators for AN/FRT-15B; includes Modulator, Audio Frequency Amplifier AM-1150/FRT-15B, Radio Frequency Oscillator O-317/FRT-15B, Radio Frequency Modulator MD-245/FRT-15B, Radio Frequency Oscillator O-324/FRT-15B, Excitation Control, Power Supply PP-1197/FRT-15B; Electrical Equipment Cabinet CY-1716/FRT-15B; CBIK Dwg No. 3893-1	One major assembly
		AMPLIFIER, AUDIO FREQUENCY AM-1150/FRT-15B: 150-3500 cps flat within 3 db; 500-ohm input; 25 db gain; internal MCW 1000 cps osc; 10-15/32 in. h, 19 in. w, 14-1/8 in. d; rack mtd; CBIK No. 4258	One major assembly
		OSCILLATOR, RADIO FREQUENCY O-317/FRT-15B: 2.0-4.5 Mc range, 10 channels each 2.0-4.5 Mc; 2 w; crystal plus interpolation control circuit; external power req'd, 220 V ac, 6.3 V ac, 50/60 cps, one phase, and 240 V dc, -48 V dc; integral coils; 10-15/32 in. h, 19 in. w, 15-3/8 in. d; rack mtd; CBIK Dwg No. 3889	p/o OA-745/FRT-15B
		MODULATOR, RADIO FREQUENCY MD-245/FRT-15B: A-4 emission; p/m 500 cps for FSK, p/m 1000 cps for photo; can be phase modulated by 200 cps; p/m 2 db response for photo trans, 0-2000 cps; 600-ohm input impedance, 50-ohm output impedance; external power req'd, 220 V ac, 6.3 V ac, 50-60 cps, one phase, and 240 V dc, 160 V dc, -108 V dc, -48 V dc; 10-15/32 in. h, 19 in. w, 14-1/2 in. d; rack mtd; directly calibrated shift dial and tuning dial; CBIK Dwg No. 3888	p/o OA-745/FRT-15B
		OSCILLATOR, RADIO FREQUENCY O-324/FRT-15B: 2.0-4.2 Mc; 10 channels provided, crystals not supplied; 1 watt; external pw'r req'd, 220 V ac, 50/60 cps, single phase, 460 V dc, -48 dc; 6-31/32 in. h, 19 in. w, 9 in. d; rack mtd; CBIK No. 4257	One major assembly
		POWER SUPPLY PP-1197/FRT-15B: electronic recitfier, half and full wave; output includes -240 V dc (240 ma), -160 V dc (20 ma), -108 V dc (5 ma), and 6.3 V ac (10A), 6.3 V ac (3A), 6.3 V ac (0.9A); external power req'd 220 V ac, 50/60 cps, one phase; 8-23/32 in. h, 19 in. w, 13-3/8 in. d; rack mtd; CBIK Dwg No. 3894	p/o OA-745/FRT-15B

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
		CABINET, ELECTRICAL EQUIPMENT CY-1716/FRT-15B: steel, light Navy grey enamel finish; 84 in. h, 29 in. w, 31 in. d; floor mtd; CKJ No. 13344	Cabinet for OA-745/FRT-15B
		POWER SUPPLY ASSEMBLY PP-1198/FRT-15B: p/o Transmitter, Radio AN/FRT-15B: outputs include bias at -360 V, -127 V, -124 V, -60 V, -24 V dc; relay -48 V dc at 1A cont or 6A intermittent; exciter plus RF screen +460 V dc at 600 ma, modulator screen +960 V dc at 300 ma, RF amplifier and modulator plates 4200 V dc at 2A; input is 220 V ac, 3-phase, 7 KW at 93% power factor; 84 in h, 26 in. w, 31 in. d; floor mtd; CBIK Dwg No. 3893-2	One major assembly
		AMPLIFIER, RADIO FREQUENCY AM-1116/FRT-15B: p/o Transmitter, Radio AN/FRT-15B; 84 in. h, 29 in. w, 31 in. d; floor mtd; amplifies r-f energy and couples it to antenna, includes autotune control circuits; CBIK No. 3893-3	One major assembly
		CONTROL TRANSMITTER C-1501/FRT-15B: p/o Transmitter, Radio AN/FRT-15B; automatic control; external power req'd, 110 V ac, 50/60 cps, one phase; no mechanical limits; steel enamel finished case; 8-3/4 in. h, 19 in. w, 9-7/8 in. d; rack or table mtd; supplied w/ dial telephone set and telegraph key with cable; CBIK Dwg No. 3893-4	Major assembly (two supplied)
B-101		MOTOR, alternating current: induction; 230 V ac, 50/60 cps, one phase, 1.4A; 1/15 hp, 39 oz in., single take-off, 1650 rpm, reversible; intermittent op; no built-in protection; chain and sprocket take-off; 4-5/16 in. lg, 0.3125 in. shaft dia, 1/2 in. lg from frame, two flats on shaft 90 deg apart, shaft center to mtg surface is 1-3/4 in.; CAIB No. ALP-766-8	Autotune drive
B-102		MOTOR, alternating current: squirrel cage induction; gearhead; 200 V ac 60 cps, 2 phase, 0.065 A; 1/20 hp, 40 in. oz, 1140 rotor rpm, single take-off, shaft rpm 19, reversible; 60C° rise for cont op; no built-in protection; direct dr take-off; 3-5/64 in. lg, 2-9/16 in. dia, 0.1875 in. shaft dia, 11/16 in. lg from frame; CBIK No. 3871	AFC drive
B-801		Same as B-101	Autotune drive
B-1301		MOTOR, alternating current: shaded pole; gearhead; 220 V ac, 50/60 cps, one phase, 0.65A; 22 in. lbs running; 27 in. lbs stall; 3300 rotor rpm, single take-off shaft rpm 14, gear ratio 236 to 1, CW; intermittent op; no built-in protection; direct dr take-off, 5/16 in. bore that extends 1/4 in. deep in shaft; 3-1/8 in. lg; 2-21/32 in. dia, 7/16 in. shaft dia, 7/16 in. lg from frame; w/ built-in brake; COB No. FYAZ 6850-2	S-1325
B-1302		MOTOR, alternating current: shaded pole; gearhead; 220 V ac, 50/60 cps, one phase, 0.31 A; 10 in. lbs running, 12 in. lbs stall, 3300 rotor rpm, single take-off, shaft rpm 14, gear ratio 236 to 1, CW; intermittent op; no built-in protection; direct dr take-off, 5/16 in. bore that extends 1/4 in. deep in shaft; 2-5/8 in. lg, 3 in. dia, 7/16 in. shaft dia, 3/32 in. lg from frame; w/ built-in brake; COB No. HYAZ 7191-1	S-1324 drive

B-1401		Same as B-1301	S-1414 drive
B-1402		Same as B-1301	S-1415 drive
B-1501		MOTOR, alternating current: capacitor start induction; 115/230 V ac, 60/50 cps, one phase, 4/2 A; 1/3 hp, 6 in. lb. single take-off, shaft rpm 3450, CW, outboard end; 40C° rise cont op; no built-in protection; direct take-off; 8-3/4 in. lg, 6-1/4 in. dia, 5/8 in. shaft dia, 1-3/4 in. lg from frame, 3-5/8 in. shaft center to mtg surface; std NEMA frame KL-F56, w/ resilient mtg base; CAQ No. E870BH	Blower drive
B-1701		MOTOR, alternating current; capacitor start induction; 115/230 V ac, 60/50 cps, one phase, 5.4/2.7A; 1/2 hp, 9 in. lb, single take-off, shaft rpm 3450, CCW, outboard end; 40C° rise for cont op; no built-in-protection; direct take-off; 9-3/4 in. lg, 6-1/4 in. dia, 5/8 in. shaft dia, 1-7/8 in. lg from frame, 3-9/16 in. shaft center to mtg surface std NEMA frame KL-H56, w/ resilient mtg base; CAQ No. E873BH	Blower drive
B-1702		MOTOR, alternating current: squirrel cage induction; 208/220 V ac, 60/50 cps, 3 phase, 1.5A; 1/3 hp, single take-off, shaft rpm 1725/1425, reversible 55C° over 40°C amb; intermittent; no built-in-protection; direct drive take-off thru rigid coupling; 8-7/17 in. lg, 6-21/32 in. h, 6-1/2 in. w, 5/8 in. shaft dia, 1-1/2 in. lg from frame; CG No. 5K43FG38	Autotune drive
C-101		CAPACITOR, fixed: ceramic; JAN CC35CH470K; 47 mmf, p/m 10%; 500 vdcw; JAN-C-20; CER	100 Kc xtal load
C-102		CAPACITOR, fixed: ceramic; JAN CC35CH101K; 100 mmf, p/m 10%; 500 vdcw; JAN-C-20; CER	100 Kc xtal load
C-103		CAPACITOR, variable: air; JAN CT1B150; single sect., 20-125 mmf; 500 vdcw; JAN-C-92; CHC No. APC 1B150	Freq. adj. 100 Kc xtal
C-104		CAPACITOR, fixed: mica; JAN CM20A471J; 470 mmf, p/m 5%; 500 vdcw; JAN-C-5; CAN	V-101 grid coupling
C-105		CAPACITOR, fixed: mica; JAN CM35B103M; 10,000 mmf, p/m 20%; 300 vdcw; JAN-C-5; CAN	V-101 plate-to-grid coupling
C-106		CAPACITOR, fixed: ceramic; JAN CC30CK200J; 20 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-107 grid coupling
C-107		CAPACITOR, fixed: mica; JAN CM20B221K; 220 mmf, p/m 10%; 500 vdcw; JAN-C-5; CAN	V-102 plate-to-grid coupling
C-108		Same as C-107	V-102 plate-to-grid coupling
C-109		Same as C-105	V-102 cathode by-pass

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-110		CAPACITOR, fixed: ceramic; JAN CC30CH101J; 100 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-102 grid coupling
C-111		Same as C-106	V-103 grid coupling
C-112		CAPACITOR, fixed: mica; JAN CM20B471K; 470 mmf, p/m 10%; 500 vdcw; JAN-C-5; CAN	V-103 plate-to-grid coupling
C-113		Same as C-112	V-103 plate-to-grid coupling
C-114		Same as C-105	V-103 cathode by-pass
C-115		CAPACITOR, fixed: ceramic; JAN CC30CK470J; 47 mmf, p/m 0.5 mmf; 500 vdcw; JAN-C-20; CER	V-104 grid coupling
C-116		CAPACITOR, fixed: paper; JAN CP55B5FF104X; o81 impreg; 3 sect. 0.1 mfd each, plus 40 minus 15%; 600 vdcw; JAN-C-25; CAN	V-101 and V-102 plate by-pass; V-104 cathode by-pass
C-117		CAPACITOR, fixed: ceramic; JAN CC30CK050D; 5 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-105 grid coupling
C-118		Same as C-105	V-105 cathode by-pass
C-119		Same as C-105; (part of Z-106)	V-105 plate by-pass
C-120A/D		CAPACITOR, variable: air; 4 sect., 241.2 mmf each; COC spec. No. 1765-4-50	Output tuning
C-121		Same as C-105	V-111 plate coupling
C-125		Same as C-105	V-107 cathode 100 Kc output

C-126		CAPACITOR, variable: air; single sect; 4-12 mmf 0.055 air gap; 300 vdcw, micaloy insulation; rotor 1-35/64 in. lg, 1.188 in. w, 27/32 in. h, mts on B-102 shaft w/ two 6-32 set screws, rotor shaft includes carn 1/8 in. thk; 3/4 in. w, 27/32 in. h to operate S-103; stator 1-3/4 in. lg, 1-3/8 in. w, 1-1/32 in. h, mtg two 6-32 studs 5/8 in. C/C; CBK rotor No. A203165, stator No. A203164	AFC correcting capacitor
C-126A		ROTOR: (maintenance item for C-126); CBK No. A203165	p/o C-126
C-126B		STATOR: (maintenance item for C-126); CBK No. A203164	p/o C-126
C-128A/D		CAPACITOR, variable: ceramic; JAN CV11B130; single sect., 3-13 mmf; 500 vdcw; JAN-C-81; CER	Output tuning trimmers
C-129		Same as C-117; (part of Z-107)	V-108 grid coupling
C-130		Same as C-115	V-113 plate-to-V-108 grid
C-132		CAPACITOR, fixed: silver mica; JAN CM15E101J; 100 mmf, p/m 5%; 300 vdcw; -20 to +100 PPM/^{o} C; 33/64 in. w, 3/16 in. deep, 16/64 in. high; 2 term., 22 AWG 1-1/8 in. lg, located each end; per MIL-C-5; CAN; (part of T-106)	V-108 plate
C-133		Same as C-132; (part of T-107)	V-109 plate
C-134		Same as C-132; (part of T-106)	V-109 grid
C-135		Same as C-132; (part of T-107)	V-110 grid
C-136		Same as C-132; (part of T-106)	V-108 plate
C-137		Same as C-132; (part of T-106)	V-109 grid
C-138		Same as C-132; (part of T-107)	V-109 plate
C-139		Same as C-132; (part of T-107)	V-110 grid
C-140		Same as C-105	V-109 cathode by-pass
C-141		Same as C-105	V-110 cathode by-pass
C-142		Same as C-132; (part of T-108)	V-110 plate
C-143		Same as C-105	V-111 cathode by-pass

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-144		Same as C-132; (part of T-108)	V-111 grid
C-145		Same as C-105	V-127 grid
C-146		Same as C-132; (part of T-109)	V-111 plate
C-147		Same as C-132; (part of T-109)	V-127 grid
C-148		Same as C-105	V-110 plate decoupling
C-149		Same as C-132; (part of T-111)	V-128 plate
C-152		Same as C-112	V-112 grid 3
C-153A/C		CAPACITOR, fixed: paper; JAN CP54B5FF104X; oil impreg; 3 sect., 0.1 mfd each, plus 40 minus 15%; 600 vdcw; JAN-C-25; CAN	V-112 plate, screen, decoupling and cathode by-pass
C-155A/C		Same as C-153A/C	V-113 screen and cathode by-pass, V-108 cathode by-pass
C-156		Same as C-105; (part of Z-105)	V-113 plate decoupling
C-157A/C		Same as C-153A/C	V-114 screen and cathode, V-131 screen by-pass
C-158		Same as C-106	V-114 grid coupling
C-159		CAPACITOR, fixed: ceramic; JAN CC30CK300J; 30 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-113 grid coupling
C-160		Same as C-112; (part of Z-103)	p/o Z-103
C-161		Same as C-112; (part of Z-103)	p/o Z-103
C-162		Same as C-112	V-115 plate

C-164		Same as C-110	V-115 plate-to-grid
C-165		Same as C-110	V-115 plate-to-grid
C-166		Same as C-105	V-115 cathode by-pass
C-167		Same as C-110	V-115 grid coupling
C-168		Same as C-115	V-116 plate-to-grid
C-169		Same as C-115	V-116 plate-to-grid
C-170		Same as C-105	V-116 cathode by-pass
C-171		Same as C-105	Interpolation circuit B+ by-pass
C-172		CAPACITOR, fixed: ceramic; JAN CC30UK680J; 68 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-116 grid coupling
C-173		CAPACITOR, fixed: ceramic; JAN CC30CK390J; 39 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-117 plate-to-grid
C-174		Same as C-173	V-117 plate-to-grid
C-175		Same as C-105	V-117 cathode by-pass
C-177		CAPACITOR, fixed: ceramic; JAN CC30PK100D; 10 mmf, p/m 0.5 mmf; 500 vdcw; JAN-C-20; CER	V-117 grid coupling
C-178		CAPACITOR, fixed: mica; JAN CM30B102K; 1000 mmf, p/m 10%; 500 vdcw; JAN-C-5; CAN; (part of Z-103)	p/o Z-103
C-179		Same as C-178	V-123 grid

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-180		Same as C-178	V-123 grid
C-181		Same as C-178	V-124 grid
C-182		Same as C-178	V-124 grid
C-183		Same as C-105	V-125 plate
C-184		Same as C-105	V-126 plate
C-188		Same as C-115	V-125 cathode
C-189		Same as C-115	V-125 cathode
C-190		Same as C-115	V-126 cathode
C-191		Same as C-115	V-126 cathode
C-193A/C		CAPACITOR, fixed: paper; JAN CP53B5EF104X; oil impreg; 3 sect., 0.1 mfd each; 600 vdcw; JAN-C-25; CAN	V-127 plate decoupling and cathode by-pass and V-128 screen by-pass
C-194		CAPACITOR, fixed: ceramic; JAN CC20CK100D; 10 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-128 plate
C-195		Same as C-194	V-128 grid coupling
C-198		Same as C-105	V-128 cathode by-pass
C-199		CAPACITOR, fixed: mica: JAN CM20B331K; 330 mmf, p/m 10%; 500 vdcw; JAN-C-5; CAN	V-129 plate
C-200		Same as C-105; (part of Z-104)	V-112 plate decoupling
C-201		Same as C-105	V-122 grid

C-202		CAPACITOR, fixed: mica; JAN CM06B150K; 15; 500 mmf; p/m 10%; 1200 vdcw; JAN-C-5; CAN	V-119 and V-120 plate
C-203		Same as C-202	V-121 and V-122 plate
C-204		CAPACITOR, fixed: paper; JAN CP61B1DF105V; oil impreg; bracket JAN CP06SA5; 1.0 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	B-102 DC blocking
C-205		CAPACITOR, fixed: paper; JAN CP53B1EF104V; oil impreg; 0.1 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	E-111 spark suppressor
C-207A/C		Same as C-193A/C	V-129 cathode and screen by-pass, for B+ by-pass for 100 Kc amp. and regenerative divider circuits
C-210		CAPACITOR, fixed: ceramic; JAN CC30CK030D; 3 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-101 plate to V-129 grid
C-211		Same as C-115	V-125 and V-126 plate
C-230		CAPACITOR, fixed: mica; JAN CM35B222M; 2200 mmf, p/m 20%, 500 vdcw; JAN-C-5; CAN	V-101 plate decoupling
C-231		CAPACITOR, fixed: ceramic; JAN CC32UK331J; 330 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-101 plate
C-232		CAPACITOR, fixed: ceramic; JAN CC32CH101J; 100mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	100 Kc xtal load
C-233		CAPACITOR, fixed: paper; oil impreg. 5.0 mfd, p/m 10%; 330 V AC; CD No. KK	B-101 phase shift
C-235		Same as C-105	V-105 screen by-pass
C-236		Same as C-105; (part of Z-107)	V-105 plate decoupling
C-237		Same as C-105	V-108 plate decoupling
C-238		Same as C-105	V-109 plate decoupling

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-239		Same as C-105	V-104 screen by-pass
C-240		Same as C-132; (part of T-108)	V-110 plate
C-241		Same as C-132; (part of T-108)	V-111 grid
C-242		Same as C-132; (part of T-109)	V-111 plate
C-243		Same as C 132; (part of T-109)	V-127 grid
C-244		CAPACITOR, fixed: ceramic; JAN CC30UK750J; 75 mmf, p/m 5%; 500 vdcw; JAN-C-20; CER	V-129 grid
C-245		CAPACITOR, fixed: ceramic; JAN CC30CK070F; 7 mmf, p/m 1.0 mmf; 500 vdcw; JAN-C-20; CER	V-103 grid
C-246		CAPACITOR, fixed: silver mica; JAN CM15270J; 47 mmf, p/m 5%; 300 vdcw; -20 to +100 PPM/°C; 33/64 in. w, 3/16 in. deep, 1/4 in. high; 2 term., 22 AWG, 1-1/8 in. lg, located each end; per MIL-C-5; CAN (part of T-111)	V-128 plate
C-247		CAPACITOR, fixed: silver mica; JAN CM15E471J; 470 mmf, p/m 5%; 300 vdcw; -20 to +100/PPM/°C; 33/64 in. w, 3/16in. deep, 15/64 in. high; 2 term., 22 AWG, 1-1/8 in. lg, located each end; per MIL-C-5; CAN; (part of T-111)	V-127 plate
C-248		Same as C-247; (part of Z-112)	V-125 plate
C-249		CAPACITOR, fixed: silver mica; JAN CM15E331J; 330 mmf, p/m 5%; 300 vdcw; -20 to +100 PPM/° C; 33/64 in. w, 3/16 in. deep, 16/64 in. high; 2 term., 22 AWG, 1-1/8 in. lg, located each end; per MIL-C-5; CAN; (part of Z-112)	V-126 plate
C-250		CAPACITOR, fixed: paper; JAN CP54BIEF205V; oil impreg; 2.0 mfd, p/m 20%; 600 vdcw; JAN-C-25; CAN	Spark suppressor for 0-111
C-251		Same as C-250	Spark suppressor for 0-111
C-253		CAPACITOR, fixed: mica; JAN CM35B472M; 4700 uuf, p/m 20%; 500 vdcw; JAN-C-5; CAN	V-104 cathode by-pass

C-254		CAPACITOR, fixed: paper; JAN CP53BIEF504V; oil impreg; 0.5 mfd, p/m 20%; 600 vdcw; JAN-C-25; CAN	B+ by-pass freq. multi-vibrator circuit
C-301		CAPACITOR, fixed: paper; JAN CP70B1DF405V; oil impreg; bracket JAN CP07SB3; 4 mfd, plus 20% minus 10%; 600 vdcw; JAN-C-25; CAN	V-304 cathode by-pass
C-302		CAPACITOR, fixed: paper; JAN CP55B1EF254V; oil impreg; 0.25 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	V-308 plate-to-grid feed-back
C-303		CAPACITOR, fixed: paper; JAN CP55B1EF104V; oil impreg; 0.1 mfg, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	V-308 grid coupling
C-304		Same as C-303	V-308 grid coupling
C-305		CAPACITOR, fixed: paper; JAN CP55B1EF504V; oil impreg; 0.5 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	By-pass limiter has V-303 cathode
C-306		Same as C-302	V-302 grid by-pass
C-307		Same as C-302	V-307 grid coupling
C-308		Same as C-302	V-306 grid coupling
C-309		Same as C-301	By-pass MIC. supply V. input
C-310A/B		CAPACITOR, fixed: mica; 2 units, JAN CM50B153G and JAN CM50B203G; tot cap. 0.035 mfd, p/m 2%; 600 vdcw; JAN-C-5; CAN	V-308 osc tank
C-311		Same as C-301	V-301 cathode by-pass
C-312		Same as C-301	V-306, V-307 plate decoupling
C-313		Same as C-301	V-304 plate by-pass
C-314		Same as C-301	V-304 plate decoupling

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-316		Same as C-178	V-303 squelch filter
C-318		Same as C-301	By-pass mod bias
C-319		CAPACITOR, fixed: paper; JAN CP70B1DH405K; oil impreg; bracket JAN CP07SC4; 4.0 mfd, p/m 10%; 1500 vdcw; JAN-C-25; CAN	By-pass mod screen
C-320		CAPACITOR, fixed: paper; JAN CP53B1EF503V; oil impreg; 0.05 mfd, plus 20% minus 10%; 600 vdcw; JAN-C-25; CAN	V-306 cathode feedback
C-321		Same as C-320	V-307 cathode feedback
C-401		Same as C-205	V-402 grid coupling
C-402		CAPACITOR, fixed: paper; JAN CP41B1DF405V; oil impreg; 4.0 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	V-401 cathode feedback
C-403		Same as C-402	V-401 plate decoupling
C-404		CAPACITOR, fixed: paper; JAN CP70B1EF106X; oil impreg; bracket, JAN CP07SD3; 10.0 mfd, plus 40 minus 15%; 600 vdcw; JAN-C-25; CAN	Filter, pwr supply
C-405		Same as C-205	V-405 grid
C-406		CAPACITOR, fixed: paper; JAN CP53B1EF504V; oil impreg; 0.5 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	V-406 by-pass
C-407		Same as C-406	V-407 by-pass
C-408		Same as C-205	V-402 grid decoupling

C-501		CP07SJ3; 10.0 mfd, plus 40 minus 15%; 2000 vdcw; JAN-C-25; CAN	filter
C-502		Same as C-501	T-507 output filter
C-503		CAPACITOR, fixed: paper; JAN CP70B1DF605K; oil impreg; bracket JAN CP07SB6; 6.0 mfd, p/m 10% 600 vdcw; JAN-C-25; CAN	+ 500 V supply filter
C-504		Same as C-503	+ 500 V supply filter
C-505		Same as C-503	+ 500 V supply filter
C-506		Same as C-503	+ 500 V supply filter
C-507		Same as C-503	-400 V supply filter
C-508		Same as C-503	-400 V supply filter
C-509		Same as C-503	-400 V supply filter
C-510		Same as C-503	-400 V sypply filter
C-511		CAPACITOR, fixed: paper; JAN CP70B1EG504K; oil impreg; bracket JAN CP07SA2; 0.5 mfd, p/m 10%; 1000 vdcw; JAN-C-25; CAN	V-524 AC grid coupling
C-512		Same as C-406	V-524 cathode filter
C-516		Same as C-406	V-529 filter
C-517		CAPACITOR, fixed: paper; JAN CP70B1EG105V; oil impreg; bracket JAN CP07SA3; 1.0 mfd, plus 20 minus 10%; 1000 vdcw; JAN-C-25; CAN	K-509 spark suppressor
C-518		Same as C-204	K-509 spark suppressor
C-601		Same as C-301	K-603 spark suppressor

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-602		Same as C-301	K-603 spark suppressor
C-603		Same as C-305	Dial line filter
C-604		CAPACITOR, fixed: paper; JAN CP53B1EF254V; oil impreg; 0.25 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	K-612 spark suppressor
C-701		CAPACITOR, fixed: paper; JAN CP53B1EB105V; oil impreg; 1.0 mfd, plus 20 minus 10%; 100 vdcw; JAN-C-25; CAN	S-711 spark suppressor
C-702		Same as C-701	S-712 spark suppressor
C-801		Same as C-105	RF coupling
C-802		CAPACITOR, fixed: paper; JAN CP29A1DF104M; oil impreg; 0.1 mfd, p/m 20%; 600 vdcw; JAN-C-25; CAN	V-801 cathode by-pass
C-803		Same as C-105	V-801 screen by-pass
C-804		Same as C-105	V-802 screen by-pass
C-805A/E		CAPACITOR, variable: air; 5 sect., #1 402 mmf, #2 402 mmf, #3 201 mmf, #4 201 mmf, #5 201 mmf; p/m 1%, plus 1 mmf, p/m 0.5%, plus 1 mmf between sect.; COC spec. No. 1766-5-50 - shaft length 1"	RF tuning
C-806		CAPACITOR, VARIABLE: ceramic; JAN CV11D450, single sect; 7-45 mmf; 500 vdcw; JAN-C-81; CER: (part of T-801)	L-802 tuning trimmer
C-807		CAPACITOR, fixed: mica; JAN CM30B681J; 680 mmf, p/m 5%; 500 vdcw; JAN-C-5; CAN: (part of T-802)	T-802 filter
C-808		Same as C-806; (part of T-802)	L-806 tuning trimmer
C-809		Same as C-105 (part of T-802)	V-803 grid decoupling

C-810		Same as C-105	V-803 cathode by-pass
C-811		Same as C-105	V-803 screen by-pass
C 812		Same as C-105; (part of Z-801)	V-803 plate decoupling
C-813		Same as C-806; (part of Z-801)	L-807 tuning trimmer
C-814		CAPACITOR, fixed: mica; JAN CM30B222K; 2200 mmf, p/m 10%; 500 vdcw; JAN-C-5; CAN: (part of Z-801)	V-804 grid coupling
C-815		Same as C-105; (part of Z-801)	V-804 grid de-coupling
C-816		Same as C-105	V-804 screen by-pass
C-817		Same as C-105; (part of Z-802)	V-804 plate de-coupling
C-818		Same as C-105; (part of Z-802)	RF coupling to L-811
C-819		Same as C-806; (part of Z-802)	L-811 tuning trimmer
C 820		Same as C-105	V-808 screen by-pass
C-821		Same as C-105	V-808 plate de-coupling
C-822		Same as C-105	RF coupling AC balance adj.
C-823		Same as C-406	AF coupling V-807
C-824		Same as C-105	V-809 cathode by-pass
C-825		Same as C-105	V-810 cathode by-pass

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-826		Same as C-105	V-812 cathode by-pass
C-827		Same as C-701	S-808 spark suppressor
C-828		Same as C-233	B-801 phase shift capacitor
C-829		CAPACITOR, fixed: mica; JAN CM30B222M; 2200 mmf, p/m 20%; 600 vdcw; JAN-C-5; CAN; (part of Z-804)	V-807 phase shift capacitor
C-830		Same as C-829; (part of Z-804)	V-807 phase shift capacitor
C-831		Same as C-829; (part of Z-804)	V-807 phase shift capacitor
C-832		CAPACITOR, fixed: mica; JAN CM30B102M; 1000 mmf, p/m 20%; 600 vdcw; JAN-C-5; CAN	RF coupling to V-812
C-833		Same as C-247	T-803 fixed tuning capacitor
C-834		CAPACITOR, fixed: silver mica; JAN CM15E510J; 51 mmf, p/m 5%; 500 vdcw; -20 to +100 PPM/^{O} C; 17/32 in. w; 5/16 in. deep, 7/32 in. high, 2 term., 22 AWG, 1-1/8 in. lg, located each end; per MIL-C-5; CAN	V-808 fixed grid tuning capacitor
C-835		CAPACITOR, fixed: silver mica; JAN CM15E200J; 20 mmf, p/m 5%; 300 vdcw; -20 to +100 PPM/^{O} C; 17/32 in. w, 5/16 in. deep, 7/32 in. high; 2 term., 22 AWG, 1-1/8 in. lg, located each end; per MIL-C-5; CAN	V-808 grid coupling
C-836		CAPACITOR, fixed: silver mica; JAN CM15E470J; 47 mmf, p/m 5%; 300 vdcw; per MIL- C-5; CAN	V-809 grid
C-837		Same as C-132	V-810 grid
C-838		Same as C-249	V-809 grid

C-839		Same as C-838	V-810 grid
C-840		CAPACITOR, fixed: silver mica; JAN CM15E511J; 510 mmf, p/m 5%; 300 vdcw; -20 to + 100 PPM/°C; 17/32 in. w, 5/16 in. deep, 7/32 in. high; 2 term., 22 AWG, 1-1/8 in. lg, located each end; per MIL-C-5; CAN	V-809 grid
C-841		Same as C-840	V-809 grid
C-842		Same as C-840	V-810 grid
C-843		Same as C-840	V-810 grid
C-844		CAPACITOR, variable: air; single sect., 2.6 to 19.7 mmf; 750 V RMS at 2.0 mc; CEJ No. 20M11	V-808 grid
C-845		Same as C-844	V-808 grid
C-846		Same as C-844	V-808 grid
C-847		Same as C-844	V-808 grid
C-848		CAPACITOR, fixed: mica; JAN CM35B472M; 4700 mmf, p/m 20%; 500 vdcw; JAN-C-5; CAN	V-811 grid
C-849		Same as C-105	V-811 grid
C-850		Same as C-848	V-811 grid
C-851		CAPACITOR, fixed: mica; JAN CM20B101K; 100 mmf, p/m 10%; 500 vdcw; JAN-C-5; CAN	V-811 grid
C-852		Same as C-105	V-811 plate decoupling
C-853		Same as C-105	V-811 plate
C-854		Same as C-105	V-811 plate
C-855		CAPACITOR, fixed: paper; JAN CP54B1EF504V; 0.5 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	+150 V decoupling
C-856		Same as C-205	V-807 screen by-pass
C-857		Same as C-204	V-807 screen decoupling

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-858		Same as C-802	V-811 grid coupling
C-859		Same as C-844	V-810 plate trimmer
C-860		CAPACITOR, fixed: silver mica; JAN CM15E300J; 30 mmf, p/m 5%; 500 vdcw; -20 to +100 PPM/°C; 17/32 in. w, 5/16 in. deep, 7/32 in. high; 2 term 22 AWG, 1-1/8 in. lg, located each end; per MIL-C-5; CAN	V-810 plate
C-861		CAPACITOR, variable: air; single sect; 4.6-75 mmf; 500 vdcw; CHC No. APC 75	Osc. tuning V-808 grid
C-862		Same as C-105	V-809 screen by-pass
C-867		Same as C-105	V-812 plate de-coupling
C-868		Same as C-250	O-809 spark suppressor
C-869		Same as C-250	O-809 spark suppressor
C-901		Same as C-806	Channel one freq. adj.
C-902		Same as C-806	Channel two freq. adj.
C-903		Same as C-806	Channel three freq. adj.
C-904		Same as C-806	Channel four freq. adj.
C-905		Same as C-806	Channel five freq. adj.

C-906		Same as C-806	Channel six freq. adj.
C-907		Same as C-806	Channel seven freq. adj.
C-908		Same as C-806	Channel eight freq. adj.
C-909		Same as C-806	Channel nine freq. adj.
C-910		Same as C-806	Channel ten freq. adj.
C-912		Same as C-837	Grid V-901 adj
C-914		CAPACITOR, fixed: mica; JAN CM35B103K; 10.000 mmf, p/m 10%; 300 vdcw; JAN-C-5; CAN	V-901 screen by-pass
C-915		Same as C-178	V-901 plate coupling
C-916		Same as C-320	V-902 cathode by-pass
C-918		Same as C-914	V-902 plate decoupling
C-919		CAPACITOR, fixed: mica; JAN CM35B472K; 4700 mmf, p/m 10%; 500 vdcw; JAN-C-5; CAN	M-901 RF by-pass
C-920		Same as C-701	S-902 spark suppressor
C-921		Same as C-701	K-901 spark suppressor
C-1001		CAPACITOR, fixed: paper; JAN CP70B1DF106V; oil impreg; bracket, CP07SC4; 10.0 mfd, plus 20 minus 10%; 600 vdcw; JAN-C-25; CAN	+240 and +160 VDC filter
C 1002		Same as C-1001	+240 and +160 VDC filter

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-1003		Same as C-301	-105 V filter
C-1004		Same as C-301	-105 V filter
C-1005		Same as C-301	-105 V filter
C-1006		Same as C-205	V-1004 by-pass
C-1007		Same as C-205	V-1008 grid
C-1008		Same as C-205	V-1010 grid
C-1101		CAPACITOR, fixed: mica; JAN CM20B471M; 470 mmf, p/m 20%; 500 vdcw; JAN-C-5; CAN	Grid coupling V-1101
C-1102		Same as C-105	Fil. by-pass V-1101
C-1103		Same as C-105	Grid decoupling V-1101
C-1104		CAPACITOR, fixed: mica; JAN CM35B102M; 1000 mmf, p/m 20%; 500 vdcw; JAN-C-5; CAN	Screen by-pass V-1101
C-1105		CAPACITOR, variable: air; JAN CT3C010; single sect; 4-9 mmf; 600 vdcw; JAN-C-92; CHC No. APC 3C010	Plate trimmer V-1101
C-1106		CAPACITOR, variable: air; single sect., 12-244 mmf; 0.045 gap; 4-31/32 in. lg, 2-5/8 in. w, 2-19/32 h; shaft 1-1/2 in. lg, 1/4 in. dia; 2 mtg holes 0.140 in. dia. on 3-7/32 in. centers; screw dr adj; CEJ No. 154-1, type 250 E20	Plate tuning V-1101
C-1107		CAPACITOR, fixed: mica; JAN CM45B103K; 10,000 mmf, p/m 10%; 600 vdcw; JAN-C-5; X CAN	Plate decoupling V-1101
C-1108		CAPACITOR, fixed: mica: JAN CM30B332M; 3300 mmf, p/m 20% 500 vdcw; JAN-C-5; CAN	Grid coupling V-1102
C-1109		Same as C-1107	Cathode by-pass V-1102

C-1110		Same as C-1107	Screen by-pass V-1102
C-1111		CAPACITOR, fixed: mica; JAN CM35B103M; 10,000 mmf, p/m 20%; 300 vdcw; JAN-C-5; CAN	Grid decoupling V-1102
C-1112		Same as C-1107	Plate decoupling V-1102
C-1113		Same as C-1107	Screen decoupling V-1103
C-1114		Same as C-1105	Plate trimmer V-1102
C-1115		CAPACITOR, fixed: mica; JAN CM20B221M; 220 mmf, p/m 20%; 500 vdcw; JAN-C-5; CAN	V-1103 grid coupling
C-1116		Same as C-1107	V-1103 cathode by-pass
C-1117		Same as C 1107	V-1103 grid decoupling
C-1118		Same as C-1107	V-1103 screen decoupling
C-1119		CAPACITOR, fixed: mica; JAN CM20B511M; 510 mmf; p/m 20%; 500 vdcw; JAN-C-5; CAN	V-1103 screen by-pass
C-1120		Same as C-1105	V-1113 plate trimmer
C-1121		CAPACITOR, fixed: plate; single sect; 1000 mmf; 500 vdcw; 6 in. lg, 5-7/8 in. w, 5/64 in. thk; DuPont Mylar Type A 0.0075 in. thk insulating sect; No. 14 gage 0.064 alum plate and chassis gnd; CBIK No. 4159 and 4160	V-1103 plate by-pass
C-1121A		INSULATOR, plate: (maintenance item for C-1121); CBFZ Type A Mylar, 0.0075 in. thk; CBIK No. 4159	p/o C-1121
C-1122		Same as C-1107	V 1103 plate decoupling
C-1123		Same as C-1107	V-1104, V-1105 grid decoupling

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-1124		CAPACITOR, fixed: mica; JAN CM45B680G; 68 mmf, p/m 2%; 2500 vdcw; JAN-C-5; CAN	V-1104, V-1105 grid coupling
C-1125		Same as C-105	V-1104, V-1105 cathode by-pass
C-1126		Same as C-105	V-1104, V-1105 cathode by-pass
C-1127		Same as C-919	V-1104, V-1105 screen by-pass
C-1128		CAPACITOR, fixed: plate; two sect; fil 810 mmf, screen 735 mmf, p/m 20%; 500 vdcw; no case; 6-3/8 in. lg. 3-5/8 in. w, 3/8 in. thk; CBIK No. 4141	V-1104, V-1105 cathode and screen by-pass
C-1129		Same as C-701	S-1101 spark suppressor
C-1130		Same as C-205	V-1107 grid coupling
C-1136		Same as C-1107	By-pass reg. 220V
C-1137		Same as C-1107	By-pass reg. 220V
C-1138		Same as C-1107	By-pass remote channel info.
C-1139		Same as C 1107	Squelch bias by-pass
C-1140		Same as C-1106 except shaft 2-9/32 in lg; CBIK No. 3853	V-1102 plate tuning
C-1141		Same as C-1106	V-1103 plate tuning
C-1301		Same as C-1106	P. A. grid tuning

C-1302		CAPACITOR, fixed; Mylar; 1500 mmfd; p/m 20%; 2000 vdcw; 1 amp at 30 mc; no case; 13-3/4 in. lg, 8 in. w, 5/8 in. h; chassis is gnd side, 1 aluminum plate is high side; 4 mtg holes 0.375 in. dia on 4 in., 10 in. centers; CBIK No. 3550 and No. 3948	IPA plate and P. A. grid circuit by-pass
C-1302A		INSULATOR, plate: (maintenance item for C-1302); CBFZ Type A Mylar, 0.0075 in. thk; CBIK No. 3948	p/o C-1302
C-1303		CAPACITOR, fixed: mica; JAN CM50A202M; 2000 mmf, p/m 20%; 2500 vdcw; JAN-C-5; CAN	V-1301, V-1302 grid by-pass
C-1304		Same as C-1303	V-1302 screen by-pass
C-1305A/E		CAPACITOR, fixed: Mylar; 1500 mmfd; p/m 20% each sect; 5 sect; 2000 vdcw; 1 amp at 30 mc; no case; 13-3/4 in. lg, 7-5/8 in. w, 1-1/2 in. h; 2 brass plates common gnd, 5 brass plates from high side; 9 mtg holes in one gnd plate, 3 holes 0.144 in. dia on 5 in. centers, 6 holes 0.218 in. dia 3 each on -1-25/32 in. radius 90° apart; CBIK No. 3909	V-1301, V 1302 cathode and screen by-pass
C-1306		Same as C-1303	V-1301 screen by-pass
C-1307		CAPACITOR, variable: vacuum; 12-500 mmf; 10,000 vdcw; 60 amp; CAZG No. UCS, modified per CBIK No. 4331 to include cable attachment	P. A. plate tuning
C-1308		CAPACITOR, fixed: mica; JAN CM80B152J; 1500 mmf, p/m 5%; 10,000 vdcw; JAN-C-5; CAN	V-1301, V-1302 plate by-pass
C-1309		CAPACITOR, fixed: mica; JAN CM45A102M; 1000 mmf, p/m 20%; 2500 vdcw; JAN-C-5; CAN	+960 V by-pass
C-1310		CAPACITOR, fixed: mica; JAN CM35A102M; 1000 mmf, p/m 20%; 500 vdcw; JAN-C-5; CAN	V-1301, V-1302 screen voltage by-pass
C-1311		Same as C-1310	V-1301, V-1302 grid voltage by-pass
C-1312		Same as C-1310	V-1301, V-1302 cathode meter line by-pass
C-1313		Same as C-1310	T 1301 pri by-pass

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C-1314		Same as C-1310	S-1326 by-pass
C-1315		Same as C-1310	T-1301 pri by-pass
C-1316		Same as C-1310	H. V. hold-off control line by-pass
C-1317		Same as C-1310	S-1326 by-pass
C-1318		Same as C-1310	220V AC by-pass
C-1319		CAPACITOR, fixed electrolytic; JAN CE41B600Q; 60 mfd; 400 vdcw; electrolytic; JAN-C-62; CSF	B-1301 electronic brake
C-1320		CAPACITOR, variable: air; single sect., 5-52 mmf; 0.045 in. gap; 2-3/4 in. lg, 2-1/6 in. w, 2-17/64 in. h; shaft 3/4 in. lg, 1/4 in. dia; screw dr adj; CEJ No. 165-2 type 50G20	V-1301, V-1302 grid coupling
C-1321		Same as C-1310	220 V AC by-pass
C-1401		Same as C-1307	Output network series tuning
C-1402		CAPACITOR, fixed: vacuum; 400 mmf p/m 5%; 10,000 vdcw; 60 amp; CAZG No. JCS-400	Fixed output matching
C-1403		Same as C-1402	Fixed output matching
C-1404		Same as C-1402	Fixed output matching
C-1405		CAPACITOR, fixed: mica; JAN CM75B102J; 1000 mmf, p/m 5%; 6000 vdcw; JAN-C-5; CAN	Fixed output matching
C-1406		CAPACITOR, variable: air; single butterfly rotor, 2 sect stator; 100 to 1000 mmf/sect; 0.120 in. gap, 5000 V peak; CBIK No. 4046; Stephen Decatur New York City, New York	Load tuning

C-1407		CAPACITOR, variable: air; single sect; 28 to 100 mmf; 0.20 in. gap; 4000 vdcw; mycalex insl; 10-3/8 in. lg, 4 in. w, 4-5/8 in. h, mtg holes 0.169 in. on 9-1/2 in. centers; CBIK No. 4054	Balance adj.
C-1408		Same as C-1319	B-1401 electronic brake
C-1409		Same as C-1319	B-1402 electronic brake
C-1502		CAPACITOR, fixed: paper; JAN CP70B1DG106V; bracket JAN CP07FD5; oil impreg; 10.0 mfd, plus 20 minus 10%; 1000 vdcw; JAN-C-25; CAN	P. A. screen by-pass
C-1601		CAPACITOR, fixed: orlite; oil impreg; 4 mfd, p/m 10%; 6000 vdcw; 4-9/16 in. w, 3-3/4 in. d, 10-11/16 in. h; 2 insl standoff terms. 2 in. apart; tot 4 mtg holes in 2 brackets, 0.187 in. dia, 4-3/4 by 3-3/8 in. apart C/C; No. OE60-405; Plastic Capacitors Inc., 2511 West Moffat Street, Chicago 47, Illinois	Filter +4200 V supply
C-1602		Same as C-1601	By-pass P. A. plate mod winding of T-1501
CB-501		CIRCUIT BREAKER: 220 V AC, 50 amp, 60 cps; back connected; CHN No. 3363 SM6-50	PP-1198 main power input
CR-301		RECTIFIER, copper oxide: 6V AC, 45V DC, 5 ma DC; Bradley Labs, Inc., New Haven, Conn., No. CX2E2D-139	M-1501 rectifier
CR-501		RECTIFIER, metallic: sel plates, bridge connected; input 70 V, one phase; output 48 V, 1.4 amp, full-wave; 4-15/16 in. lg, 3-3/8 in. sq. plates, term extending 3/8 in. beyond plates, studs extend 9/16 in. each side; CAFQ No. V3B1S1HB4	DC relay supply PP-1198
CR-1301		RECTIFIER, metallic: sel; cir No. 5 Ref Dwg Gr No. 23; input 260 V rms, one phase; output 311 V, 65 ma, half-wave; 1-1/16 in. w, 1 in. sq; CAFQ No. 16J1	B-1301 electronic brake
CR-1401		Same as CR-1301	B-1401 electronic brake
CR-1402		Same as CR-1301	B-1402 electronic brake

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION		NAME AND DESCRIPTION	LOCATING FUNCTION
E-109		TERMINAL STUD: ceramic, L-5; silicone impreg; hex base, 5/16 in. w, 17/32 in. h OA, stud is 6-32, 1/4 in. lg: CAMQ No. X1942X	Tie point for R-155, C-152
E-110		TERMINAL STUD: ceramic, L-5; silicone impreg; CAMQ No. X1990	Chassis feed-thru
E-111		OVEN, crystal: one xtal unit type H-18; +50 ^{O}C to +70^{O} C, p/m 1C^{O}; 110 V ac, 50/60 cps, one phase; 4-5/8 in. h, 3-3/4 in. dia; xtal mtd in type JK07E oven, u/w Johnson No. 247 socket; CADI No. JK07E	100 Kc std
E-111A		OVEN, crystal: (maintenance item for E-111); CADI No. JK07E less crystal	Temp control and heater
E-112 thru E-119		SHIELD, electron tube: JAN TSFOT104; ni pl br; 1-1/2 in. lg, 0.950 in. ID; per JAN-S-28A; CEB per JAN	Shields for V-101, V-102, V-103, V-115, V-116, V-117, V-123, V-124
E-120 thru E-129		SHIELD, electron tube: JAN TSFOT101; ni pl br; 1-3/8 in. lg. 0.810 in. ID; per JAN-S-28A; CEB per JAN	Shields for V-104, V-105, V-107, V-109, V-111, V-113, V-118, V-125, V-126, V-129
E-130 thru E-134		SHIELD, electron tube: JAN TSFOT102; ni pl br; 1-3/4 in. lg, 0.810 in. ID; per JAN-S-28A; CEB per JAN	Shields for V-108, V-110, V-112, V-127, V-128
E-135 thru E-139		SHIELD, electron tube: JAN TSFOT105; ni pl br; 1-15/16 in. lg, 0.950 in. ID; JAN-S-28A; CEB per JAN	Shields for V-114, V-119, V-120, V-121, V-122
E-501 thru E-503		TERMINAL STUD: phenolic; sil pl; 13/16 in. lg, 5/16 in. dia, stud is 6-32, 1/4 in. lg; CAMQ No. X 1581	Resistor mounting 1000 V supply
E-504 thru E-506		INSULATOR, stand-off: steatite cone; white glazed finish; 1 in. lg, 3/4 in. base dia, 1/2 in. top dia, tapped each end for 8/32 in. sc; supplied w/hardware; per JAN-I-10; CEJ No. 135-501	Base of PP-1198

E-507A thru E-510A		INSULATOR, feed-thru: JAN NS4W4103; ceramic, L-4; white glazed per JAN-I-8; CAS per JAN	Center of PP-1198
E-507B thru E-510B		INSULATOR, feed-thru: JAN NS4W4203; ceramic, L-4; white glazed per JAN-I-8; CAS per JAN	Center of PP-1198
E-511 thru E-517		Same as E-504	Top of PP-1198
E-524 thru E-529		Same as E-501	Base of PP-1198
E-541		Same as E-501	Base of PP-1198
E-566		Same as E-110	Top of PP-1198
E-567		Same as E-110	Top of PP-1198
E-568 thru E-591		INSULATOR, stand-off: JAN NS4W0308; steatite, L-4, white glazed; 1 in. lg, 3/4 in. dia, tapped each end for 10-32. sc; per JAN-I-8; CDP per JAN	Top of PP-1198
E-592		Same as E-130	Top of PP-1198
E-593 thru E-597		SHIELD, electron tube: JAN TSFOT103; ni pl br; 2-1/4 in. lg, 0.810 in. ID; per JAN-S-28A; CEB per JAN	Tube shields
E-598		Same as E-501	Base of PP-1198
E-599		Same as E- 501	Base of PP-1198
E-701		INSULATOR, stand-off: melamine body, 1/4 dia, 23/32 H; threaded insert for 4-40 SCR. WIQ No. 756	Mounting for R-701
E-702		Same as E-701	Mounting for R-702
E-801 thru E-811		Same as E-701	Chassis standoff
E-812 thru E-815		Same as E-110	Chassis feed through

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E-868		Same as XV-301	Test points
E-876		Same as E-110	Chassis feed-thru
E-877		Same as E-110	Chassis feed-thru
E-878		BAR, locking: thumb sc actuated; br, ni pl; "U" shape; 61/64 in. lg, 61/64 in. w, 7/16 in. d; CNA No. ODL	Deviation lock
E-879		POINTER, dial: stud mtd, 4-40 thd; br, ni pl; 3/4 in. lg, 3/8 in. w, 7/16 in d; CNA No. DP-1	Deviation pointer
E-880 thru E-883		INSULATOR, stand-off: JAN NS5W0104, ceramic, L-5; white glazed; 1/2 in. lg, 3/8 in. dia, tapped each end for 6-32 sc; per JAN-I-8; CDP per JAN No.	Chassis standoff
E-884		Same as E-112	Tube shield
E-885 thru E-888		Same as E-120	Tube shields
E-889 thru E-893		Same as E 130	Tube shield
E-894		SHIELD, electron tube: JAN TSFOT105; ni pl br; 1-15/16 in. lg, 0.950 in. ID; per JAN-S-28A; CEB per JAN	Tube shield
E-895		OVEN, tuned circuit: p/o MD-245/FRT-15B; FSK circuits; 8-5/8 in. h, 6 in. w, 6 in. d, OA; outer oven 1/16 in. alum, inner oven 1/16 in. alum w/spun glass between alum walls; contains heater element HR-801, not sealed; tubes V-808, V-809, V-810 mtd external; pwr req'd is, 6.3V AC at 0.9A, -105 V DC at 0.020A, +160 V DC at 0.030A, 110 V AC at 1A; supplied w/one 10 cond cable 12 in. lg of 18 AWG stranded and terminated w/P-805, also a 3 cond cable 10 in. lg of 18 AWG stranded and terminated w/solder lugs; CBIK No. 4295	FSK circuits
E-901 thru E-908		Same as E-880	Insulation and support xtal oven

E-909 thru E-912		INSULATOR, stand-off: ceramic, L 5; Dow Corning No. 200 finish; 1-1/8 in. lg, 1/8 in. ID, 1/4 in. OD; CBIK No. 4130	Insulation and support xtal sockets mtg plate
E-914		OVEN, crystal: mtg sockets XY-901/10 for 10 type CR-26/U xtals; 75C° from ambient of 0-65° C, thermostat S-901 control sc dr adj; temp indicator not incld; 30 W; 3 in. dia, 2-15/16 in lg, includes HR-901, S-901, S-904; CBIK No. 4126	Xtal oven assy
E-916		Same as E-120	Shield V-901
E-1001		Same as E-130	Shield V-1008
E-1002		Same as E-130	Shield V-1010
E-1003		Same as E-593	Shield V-1003
E-1004		Same as E-593	Shield V-1004
E-1201		Same as E-593	Shield V-1204
E-1202		Same as E-894	Shield V-1201
E-1203		Same as E-894	Shield V-1202
E-1204		Same as E-894	Shield V-1203
E-1301		INSULATOR, stand-off; JAN NS4W0316; Alsimag 228, glazed 195; 2 in. lg, 3/4 in. dia, tapped each end for 10-32 sc; per JAN-I-8; CAS per JAN	C-1307 mtg
E-1302		Same as E-1301	C-1307 mtg
E-1303		Same as E-1301	C-1307 mtg
E-1304		Same as E-1301	C-1307 mtg
E-1305		Same as E-568	C-1307 dr
E-1310		INSULATOR, stand-off: melamine body, 1/4 in. dia, 23/32 in. h; threaded insert for 4-40 sc; WIQ No. 756	R-1303 tie point

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E-1401		INSULATOR, stand-off: JAN NS4W0416; ceramic grade L-4; 2 in. lg, 1 in. dia, tapped each end for 1/4-20 sc; per JAN-I-8; CAS per JAN	C-1401 mtg
E-1402		Same as E-1401	C-1401 mtg
E-1403		Same as E-1401	C-1401 mtg
E-1404		Same as E-1401	C-1401 mtg
E-1405		Same as E-568	C-1401 dr insulator
E-1406		INSULATOR, stand-off: JAN NS4W0312; ceramic grade L-4; 1-1/2 in. lg, 3/4 in. dia, tapped each end for 10-32 sc; per JAN-I-8; CAS per JAN	Insulator and support C-1402, C-1403, C-1404
E-1407		Same as E-1406	Insulator and support C-1402, C-1403, C-1404
E-1408		Same as E-1406	Insulator and support C-1402 C-1403, C-1404
E-1409		Same as E 1406	Insulator and support C-1402, C-1403, C-1404
E-1501A		ARRESTER, electrical surge: disc type Thyrite, 1735 V p/m 18% at 0.0025 A test w/max 3.5 W cont; 3.0 in. dia, 0.78 in. thk; CG No. 3993037	Surge arrester mod trans.
E-1501B		Same as E-1501A	Surge arrester mod trans.
E-1501C		Same as E-1501A	Surge arrester mod trans.
E-1502A		BALL, electrode: br, chrom pl, polished; 3/4 in. dia; CBIK No. 3882	Ball gap mod trans.

E-1502B		Same as E-1502A	Ball gap mod trans.
E-1701 thru E-1703		INSULATOR, bowl: JAN NP5W4601; steatite, L-5; white glazed finish; supplied w/hardware; CDP No. 1101-01	Antenna output
F-101		FUSE, cartridge: 3.2 amp, u/w 220 V; slow blow, 3 sec at 500% load; ferrule type; glass enclosed; 1/4 in. dia, 1-1/4 in. lg; CFA No. MDL-3.2	B-101 protection
F-102		FUSE, cartridge: 3 amp, 250 V; ferrule type; glass enclosed; 1/4 in. dia, 1-1/4 in. lg; CFA No. AGC-3	E-111 protection
F-301		Same as F-102	Protection T-305
F-302		FUSE, cartridge: 5 amp, 250 V: ferrule type; glass enclosed; 1/4 in. dia, 1-1/4 in. lg; CFA No. MTH-5	T-306 protection
F-401		Same as F-102	T-403 protection
F-501		Same as F-102	Primary T-507
F-502		Same as F-102	Primary T-507
F-503		FUSE, cartridge: 10 amp, 250 V; ferrule type; ceramic enclosed; 1/4 in. dia, 1-1/4 in. lg; CFA No. ABC-10	Primary, T-502
F-504		Same as F-503	Primary, T-501, T-502
F-505		Same as F-302	Relay fuse PP-1198
F-506		Same as F-503	Relay fuse PP-1198
F-507		Same as F-503	B-1501, B-1701 input
F-508		Same as F-503	B-1501, B-1701 input
F-509		Same as F-503	B-1501, B-1701 input
F-510		Same as F-503	CR-501 output

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
F-511		Same as F-302	T-506 primary
F-512		Same as F-302	T-506 primary
F-513		Same as F-503	T-505 primary
F-514		Same as F-503	T-501 primary
F-515		Same as F-302	T-504 primary
F-516		Same as F-302	T-504 primary
F-801		Same as F-101	Protection B-801
F-802		Same as F-102	Protection HR-801
F-901		Same as F-102	T-901 protection
F-1001		Same as F 102	T-1001 protection
F-1002		Same as F-102	T-1002 protection
F-1101		Same as F-102	T-1101 protection
F-1102		Same as F-102	T-1102 protection
F-1301		Same as F-302	T-1301 protection
HR-801		HEATER ELEMENT, electrical: 34 AWG; non-inductive; 127 turns; 75 ohms dc; 75 w; 8-1/4 in. lg, 4-7/8 in. w; 4-7/8 in. d; CBIK No. 4059	Heater for E-895
HR-901		HEATER ELEMENT: 24 turns; 34 AWG Cu, Formax ins; wound about 3 in. dia alum tube 2-3/4 in. lg; 5 ohm DC; requires 12.6 V AC, 1A; CBIK No. 4297	p/o E-914

HS-401		TELEPHONE SET: cradle desk stand; electron tube rectified current; ringer not incl; drop switch signaling; w/dial; push-to-talk sw incl; 2 cir cont; CAU No. Z18643	Telephone and dial
HS-401A		Handset: (maintenance item for HS-401); CAU No. 25, U.S. Navy Type 51032	p/o HS-401
HS-401B		EAR PIECE: plastic, (maintenance item for HS-401); CAU No. D67304-A	p/o HS-401
HS-401C		RECEIVER PHONE: (maintenance item for HS-401); CAU No. D5189-A	p/o HS-401
HS-401D		MOUTHPIECE: plastic; (maintenance item for HS-401); CAU No. D38306A	p/o HS-401
HS-401E		TRANSMITTER PHONE: (maintenance item for HS-401); CAU No. D38309A	p/o HS-401
HS-401F		CABLE DESK SET: (maintenance item for HS-401); CAU No. 218643-3	p/o HS-401
HS-401G		PUSH-TO-TALK SWITCH: (maintenance item for HS-401); CAU No. D731373B	p/o HS-401
HS-401H		CABLE HANDSET: (maintenance item for HS-401); CAU No. D542724A	p/o HS-401
I-101		LIGHT, indicator: supplied w/lens, 21/32 in. lg 5/8 in. dia, yellow, smooth face and back, clear, threaded mtg; one T-3-1/4 type NE 51 miniature bayonet base neon lamp included; 220V, built-in resistor; 1-29/32 in. lg, 13/16 in. dia; supplied w/lock washer and 1/8 in. thk 5/8-18NF nut; CAYZ No. 95408-936	A. F. C.
I-101A		LAMP: neon; (maintenance item for I-101); CAYZ No. T-3-1/4 type NE-51	p/o I-101
I-101B		LENS, indicator light: yellow, 21/32 in. lg, 5/8 in. dia, plastic, smooth face and back, clear; CAYZ No. 95-936; (maint item for I-101)	p/o I-101
I-102		Same as I-101 except colorless and u/w 115V; CAYZ No. 95408-935	Oven
I-102A		Same as I-101A except maint item for I-102	p/o I-102
I-102B		Same as I-101B except colorless, (maint item for I-102); CAYZ No. 95-935	p/o I-102
I-103		Same as I-101 except red and u/w 250 V; CAYZ No. 95408-931	Plate
I-103A		Same as I-101A except maint item for I-103	p/o I-103
I-103B		Same as I-101B except red; (maint item for I-103); CAYZ No. 95-931	p/o I-103
I-104		LIGHT, illuminating: miniature bayonet base; both term ins; CAYZ No. 706-47-6.3V	Dial light
I-104A		LAMP: incand; (maint item for I-104); CAYZ No. T-3-1/4 type 47	p/o I-104

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
I-105		Same as I-104	Dial light
I-105A		Same as I-104A except maint item for I-105	p/o I-105
I-106		Same as I-104	Dial light
I-106A		Same as I-104A except maint item for I-106	p/o I-106
I-401		Same as I-101 except red and u/w 115 V; CAYZ No. 95408-931	Plate on
I-401A		Same as I-101A except maint item for I-401	p/o I-401
I-401B		Same as I-103B except red; (maint item for I-401); CAYZ No. 95-931	p/o I-401
I-501		LIGHT, indicator: supplied w/lens, 1-1/8 in. dia, colorless, smooth face and back, clear, threaded mtg; one S-6 bayonet base incand lamp included; polaroid dimmer, adj to complete blackout; 230 V; 2-5/8 in. lg 1-3/16 in. dia; supplied w/lock washer and 1/8 in. thk 15/16 -24 NF nut; CAYZ No. 78202-115-230V	Filament on PP-1198
I-501A		LAMP: incand; (maint item for I-501); CAYZ No. 10S6/10-250	p/o I-501
I-501B		LENS, indicator light: colorless, 15/16 in. lg, 1-1/8 in. dia, glass, smooth face and back, clear; supplied with polaroid dimmer, adj to complete blackout; CAYZ No. 78-115; (maint item for I-501)	p/o I-501
I-502		Same as I-501 except red; CAYZ No. 78202-111-230V	High voltage on PP-1198
I-502A		Same as I-501A except maint item for I-502	p/o I-502
I-502B		Same as I-501B except red; (maint item for I-502); CAYZ No. 78-111	p/o I-502
I-503		Same as I-501 except green; CAYZ No. 78202-112-230V	Bias on PP-1198
I-503A		Same as I-501A except maint item for I-503	p/o I-503
I-503B		Same as I-501B except green; (maint item for I-503); CAYZ No. 78-112	p/o I-503

I-504		Same as I-501 except yellow; CAYZ No. 78202-116-230V	Battle short on PP-1198
I-504A		Same as I-501A except maint item for I-504	p/o I-504
I-504B		Same as I-501B except yellow; (maint item for I-504); CAYZ No. 78-116	p/o I-504
I-801		Same as I-101 except amber and u/w 115V; CAYZ No. 95408-933	Oven on
I-801A		Same as I-101A except maint item for I-801	p/o I-801
I-801B		Same as I-104 except amber; (maint item for I-801); CAYZ No. 95-933	p/o I-801
I-802		Same as I-103	B + on
I-802A		Same as I-101A except maint item for I-802	p/o I-802
I-802B		Same as I-103B	p/o I-802
I-803		Same as I-104	Dial light
I-803A		Same as I-104A except maint item for I-803	p/o I-803
I-901		LIGHT, indicator: supplied w/cap 21/32 in. lg, 5/8 in. dia, colorless, smooth face and back, clear, threaded mtg; one T-3-1/4 incand No. 47 miniature bayonet base lamp included; 6.3 V; 1-29/32 in. lg, 13/16 in. dia; supplied w/lock washer and 1/8 in. thk 5/8-18NF nut; CAYZ No. 95410-935	Filament on
I-901A		Same as I-104A except maint item for I-901	p/o I-901
I-901B		Same as I-102B except maint item for I-901	p/o I-901
I-902		LIGHT, indicator: supplied w/cap 21/32 in. lg, 5/8 in. dia, colorless, smooth face and back, clear, threaded mtg; one T-3-1/4 incand No. 1813 miniature bayonet base lamp included; 12.6 V; 1-29/32 in. lg, 13/16 in. dia; supplied w/lock washer and 1/8 in. thk 5/8-18 NF nut; CAYZ No. 95410-935	Oven
I-902A		LAMP: incand (maint item for I-902); CAYZ No. T-3-1/4 type 1813	p/o I-902
I-902B		Same as I-102B except maint item for I-902	p/o I-902
I-1001		Same as I-101 except colorless and u/w 220V; CAYZ No. 95408-935	Power on
I-1001A		Same as I-101A except maint item for I-1001	p/o I-1001

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
I-1001B		Same as I-101B except colorless; (maint item for I-1001)	p/o I-1001
J-101		CONNECTOR, receptacle: 12 cont, male, flat, polarized, gnd'ed, straight: phone type, phos Bz connector; 1-1/4 in. lg, 15/16 in. w, 1-5/32 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.152 in. dia, 1-1/4 in. c/c; CJC No. P-312AB	Power input
J-102		CONNECTOR, receptacle: 15 cont, male, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 2-9/16 in. lg, 2-1/2 in. w, 1-1/8 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.187 in. dia, 2-1/8 in. c/c; CJC No. P-315SB	Channel info input
J-103		CONNECTOR, receptacle: 14 cont, female, rd, polarized, gnd'ed straight; phone type, phos Bz connector; 1-7/8 in. lg, 15/32 in. w; 55/64 in. h; melamine body; 2 studs, 1.562 in. mtg centers; WIQ MRE 12-2S-G	Sub-chassis connections
J-104		CONNECTOR, receptacle: 5 cont, female, rd, polarized, gnd'ed, straight; phone type, phos Bz connector; 17/32 in. lg, 21/32 in. dia; melamine body; No. 1/2-20 thd mtg nut; WIQ No. M5S-LRN	Sub-chassis connections
J-105		CONNECTOR, receptacle: 20 cont, male, rd, polarized, gnd'ed, straight; phone type, br sil pl; 2 in. lg, 3/4 in. dia; BM 120 phenolic; 2 mtg holes, 1/8 in. dia, 1-23/32 in. c/c; COL NO. 372103700	Input connections to 0-111
J-106		CONNECTOR, receptacle: AN UG-291/U; 52-ohm impedance; CBSA	100 Kc output
J-107		Same as J-106	Signal output
J-108		CONNECTOR, receptacle: AN/UG-89/U; 52-ohm impedance; CBSA	Sub-chassis connector
J-109		CONNECTOR, receptacle: JAN JJ-104; telephone type; 3 cont, 2 NC; supplied w/mtg hardware; CMA per JAN	AFC test jack
J-110		CONNECTOR, receptacle: 4 cont; male; (p/o Z-101)	Z-101 connector
J-111		Same as J-109 except p/o Z 102	Z-102 connector

			type, phos Bz connector; 3-1/2 in. lg, 1-3/8 in. w, 1-1/8 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.187 in. dia, 2-3/4 in. c/c; CJC No. P-324SB	Local-remote input
J-302			CONNECTOR, receptacle: 8 cont, male, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1-1/4 in. lg, 11/16 in. w, 1-5/32 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.152 in. dia, 1 in. c/c; CJC No. P-308AB	Pwr input
J-303			CONNECTOR, receptacle: 6 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1 in. lg, 1-5/16 in. w, 3/4 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.152 in. dia, 1 in. c/c; CJC No. S-306AB	Output to modulator
J-304			CONNECTOR, receptacle: telephone type; JAN JJ-033; per JAN-J-461; CMA per JAN	Receiver input jack
J-305			Same as J-102	Power input connections
J-306			CONNECTOR, receptacle: 6 cont, male, flat, polarized, gnd'ed straight; phone type, phos Bz connector 1 in. lg, 1-5/16 in. w, 1-5/32 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 holes, 0.152 in. dia, 1 in. c/c; CJC No. P-306AB	Signal input connections
J-307			CONNECTOR, receptacle: 2 cont, female, flat, gnd'ed, straight; phone type, phos Bz connector; 1-9/32 in. lg, 21/32 in. w, 3/4 in h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.152 in. dia, 31/32 in c/c; CJC No. S-302AB	V-310 fil. test
J-308			Same as J-307	V-309 fil. test
J-309			CONNECTOR, receptacle: telephone type; JAN JJ-034; per JAN-J-461; CMA per JAN	Key input jack
J-310			Same as J-309	Mic. input jack
J-401			Same as J-304	Key input jack
J-402			Same as J-304	Phone input jack
J-403			Same as J-309	Receiver jack
J-501 thru J-504			Same as J-307	V-530/V-541 fil. test
J-601			Same as J-101	Channel information output

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
J-602		CONNECTOR, receptacle: 27 cont, male, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 3-13/16 in. lg, 1-3/8 in. w, 1 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.187 in. dia, 3-3/8 in. c/c; CJC No. P-327SB	Power input
J-701		CONNECTOR, receptacle: 18 cont, male, flat, polarized, gnd'ed straight; phone type, phos Bz connector; 2-7/8 in. lg, 1-3/8 in. w, 1-1/4 in. h; 730 V rms, 10A; BM-120 Bakelite body; 2 mtg holes, 0.187 in. dia, 2-7/16 in. c/c; CJC No. P-318SB	Channel information input
J-702		Same as J-102	Channel information to M.O.
J-703 thru J-707		Same as J-106	R. F. outputs
J-708		Same as J-101	Channel information to FSK
J-709		CONNECTOR, receptacle: 12 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1-9/16 in. lg, 1-1/4 in. w, 1-5/32 in. h; 730 V rms, 10 A; BM-120 Bakelite body; 2 mtg holes, 0.152 in. dia, 1-1/4 in. c/c; CJC No. S-312AB	Channel information to crystal Osc.
J-801		Same as J-102	Channel inf. input
J-802		Same as J-701	Power input
J-803		CONNECTOR, receptacle: AN/UG-290/U; 52-ohm impedance; CBSA	R. F. input
J-804		Same as J-106	R. F. output
J-805		Same as J-103	Oven connector
J-806		CONNECTOR, receptacle: 4 cont, male, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1-5/16 in. lg, 3/4 in. w, 1-5/32 in. h; 730 V rms, 10 A; BM-120 Bakelite body; 2 mtg holes, 0.152 in. dia, 1 in. dia, 1 in. c/c CJC No. P-304AB	Keying input

J-807		Same as J-105	0-809 connector
J-901		Same as J-302	Power input connections
J-902		Same as J-101	Channel information connections
J-903		Same as J-106	Output connector
J-904		CONNECTOR, receptacle: 4 cont, female, rd, polarized, gnd'ed, straight; phone type, phos Bz connector; 19/32 in. lg, 5/8 in. dia; locking type; melamine body; No. 3/8-24 thd mtg nut; WIQ No. M4S-LRN	Oven connections
J-1001		Same as J-306	Power input connections
J-1002		Same as J-709	Power output connections
J-1101		Same as J-101	Power connections to excitor, IPA
J-1102		Same as J-301	Power and channel info. connection to excitor
J-1103		Same as J-106	R. F. signal connector
J-1301		Same as J-102	Power input connections
J-1302		Same as J-602	Autotune info. connections
J-1303		CONNECTOR, receptacle: 1 cont, female, rd, non-polarized, not gnd'ed, straight; phone type, br ni pl; 3-1/2 in lg, 2-1/8 in. w; 8000 V dc, 2A cont; "T" shape w/oval mtg flange; Rulon; 2 slots, 1-5/8 in. apart, 3/16 in. cut; (part of W-1909); CYA No. 8111FPB	H. V. input jack
J-1304		Same as J-307	V-1302 fil. test

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
J-1305		Same as J-307	V-1301 fil. test
J-1401		Same as J-701	Power and channel info. connections
J-1501		Same as J-307	Fil. metering jack
K-101		RELAY, armature: 4 A and 2 B Ref Dwg Gr 4; 1 winding, inductive, 220 V ac, 50/60 cps, 455-ohm AC; 1-15/16 in. lg, 1-1/4 in. w, 4-3/16 in. h; CAU No. FQA-PZ-21359-2	AFC control
K-102		RELAY, armature: 1 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 1100-ohm, 2 in. lg, 1-5/8 in. w, 2-5/16 in. h; CBER No. 33QA20F	Autotune control
K-301		RELAY, armature: 4 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 1300-ohm; 1-15/16 in. lg, 1-9/32 in. w, 4-5/8 in. h; CAU No. AQA-PR-2998-B1	MCW relay
K-302		Same as K-102	Push-to-talk relay
K-401		RELAY, armature: 1 C Ref Dwg Gr 4; 1 winding, inductive, 10 ma dc max, 5000-ohm; 1-5/8 in. lg, 1-1/4 in. w, 4-1/4 in. h; CAU No. AQA-PR-2444-B8	Push-to-talk relay
K-501		RELAY, armature: 4 C and 2 C Ref Dwg Gr 4; 2 windings, both inductive, coil No. one 10-ohm opens cont above 0.2 A, coil No. two 2000-ohm 48 V dc; 1-1/8 in. lg, 31/32 in. w, 2-9/16 in. h, CBER No. 6QA73A	Bias holding PP-1198
K-502		RELAY, solenoid: 5PST; 220 V ac, 4 P each 25 A, 1 P at 1 A; 1 winding, inductive, 220 V ac, 50/60 cps, 300-ohm AC; 7-1/16 in. lg, 5-5/8 in. w, 3-11/32 in. h; CAUS No. BD 6202-5K-1	Test contactor PP-1198
K-503		RELAY, solenoid: 3PST; 220 V ac, 50 A; 1 winding, inductive, 220 V ac, 50/60 cps, 300-ohm AC; 7-1/16 in. lg, 6-5/8 in. w, 3-11/32 in. h; CAUS No. BD6202-6K-1	Operate contactor PP-1198
K-504		RELAY, motor driven: SPDT; N.O.; 125 V ac, 15 A; sync AC motor, 230 V, 50/60 cps; adj delay 0-57 sec; 3-3/8 in. lg, 2-25/32 in. w, 2-25/32 in. h; CHP No. 5901-2	Time delay PP-1198
K-505		Same as K-503	Filament contactor PP-1198

K-506		RELAY, armature: 3 A Ref Dwg Gr 4; 1 winding, inductive, 220 V ac, 50/60 cps, 1840-ohm; 2 in. lg, 1-5/8 in. w, 2-5/16 in. h; CBER No. 33AC38A4	Blowers PP-1198
K-507		RELAY, armature: 2 C Ref Dwg Gr 4; 1 winding, inductive, 200 ma dc max, 4.6-ohm; 1-1/8 in. lg, 31/32 in. w, 2-9/16 in. h; CBER No. 6QA14M	Bias interlock PP-1198
K-508		RELAY, armature: 2 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 800-ohm; 2 in. lg, 1-5/8 in. w, 1-5/8 in. h; CBER No. 33QA4F1	Plate relay PP-1198
K-509		RELAY, armature: 4 A Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 700-ohm; 2-5/8 in. lg, 2-9/16 in. w, 2-1/2 in h; CBER No. 22 QA19A	Screen relay PP-1198
K-510		RELAY, armature: 1 B Ref Dwg Gr 4; 2 windings, both inductive, 200 ma dc max, 10-ohm, reset coil op 48 V dc, contacts 48 V dc 1A; 2-7/16 in. lg, 2-1/32 in. w, 1-7/8 in. h, studs ext'd 1-1/4 in.; HEM No. ACR-563	Overload PP-1198
K-601		RELAY, armature: 3 C Ref Dwg GR 4; 1 winding, inductive, 48 V dc, 700-ohm; 2-5/8 in. lg, 2-9/16 in. w, 2-1/2 in. h; CBER No. 22QA20A	Motor start
K-602		Same as K-508	Motor reverse interlock
K-603		RELAY, armature: 4 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 700-ohm; 2-5/8 in. lg, 2-9/16 in. w, 2-1/2 in. h; CBER No. 22QA10E	Motor reverse
K-604		RELAY, armture: 1A and 1 B Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 400-ohm; 1-15/16 in. lg, 1-9/32 in. w, 5-19/32 in. h; CAU No. AQA PR-2406-D1	Pulsing relay
K-605		RELAY, armature: 1 A, 1 B and 1 D Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 1300-ohm; 1-15/16 in. lg, 1-9/32 in. w, 5-19/32 in. h; CAU No. AQA R-2760-A3	Homing relay
K-606		RELAY, armature: 1 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 650-ohm; 0.3 sec min delay; 1-5/8 in. lg, 1-1/4 in. w, 4-1/4 in. h; CAU No. AQA PR-2932-0568	Slow release #2
K-607		Same as K-606	Slow release #1
K-608		Same as K-508	Transmitter off relay
K-609		RELAY, armature: 4 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 800-ohm; 2-1/16 in. lg, 2 in. w, 2-5/16 in. h; CBER No. 33QA3E1	FSK relay
K-610		Same as K-508	CW Relay
K-611		Same as K-606	High voltage interlock

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
K-612		RELAY, rotary: 4 P, 25 pos; 1 set B homing cont; 48 V dc, 2 A; 1 winding, not tapped, 48 V dc, 100-ohm; 6-7/8 in. lg, 2 in. w, 5-1/4 in. h; CAU No. 45	Dial information
K-703		RELAY, armature: 2 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 1100-ohm; 1-3/32 in. lg, 1-5/8 in. w, 2-5/16 in. h; CBER No. 8QA-8DC-H8-2C SLOW RELEASE	Control for S-712
K-801		Same as K-102	Autotune control
K-901		Same as K-102	Oven heater control
K-1301		Same as K-508	B-1301 control
K-1302		RELAY, armature: 3 C Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 1100-ohm; 2 in. lg, 1-5/8 in. w, 2-5/16 in. h; CBER No. 33QA6J	B-1302 control
K-1401		Same as K-1302	B-1401 control
K-1402		Same as K-1302	B-1401 control
K-1501		RELAY, armature: 3 A and 2 B Ref Dwg Gr 4; 1 winding, inductive, 48 V dc, 168-ohm; 8-1/2 in. lg, 2-1/2 in. w, 3-1/2 in. h; CSD No. 162CXB100SD	Phone CW relay
L-101		COIL, RF: layer, 3 pi; 36 AWG, enamel ins; 30 ohm dc; 75 ma; 10.0 mh; coil 3/4 in. lg, form 1 in. lg; CNA Type R-50PT4, (p/o Z-103)	Part of Z-103
L-102		COIL, RF: layer, 4 pi; 36 AWG, enamel ins; 40 ohm dc; 75 ma; 2.5 mh; coil 3/4 in. lg, form 1 in. lg; CNA Type R-50PT3	V-101 plate
L-103		Same as L-101 (p/o Z-103)	Part of Z-103
L-301		REACTOR: fixed; JAN TF1A20YY; 1 coil 0.725 mh p/m 5%;tapped at 2/3; 1200 V rms test; 1-1/2 in. sq, 2 in. h, studs 23/64 in. h; MIL-T-27; CBIK No. 4095	V-308 MCW OSC tank coil
L-302		Same as L-102	V-303 squelch bias filter
L-501		REACTOR: fixed; JAN TF1A04YY; 1 coil, 2.0 H, 2A, 8.5 ohms dc; 10,000 V rms test; 9 in. lg, 5-1/4 in. w, 8 in. h, studs 1-1/8 in. h; MIL-T-27; CBIK No. 3953	+4200 V filter

L-502		REACTOR: fixed; JAN TF1AO4YY; 1 coil, 4.0 H, 0.6 A, 25 ohms dc, 2000 V rms test; 5 in. lg, 4-1/8 in. w, 5 in. h, terms. 13/16 in. h; MIL-T-27; CBIK No. 3933	+ 500 V filter
L-503		Same as L-502	+ 500 V filter
L-504		REACTOR: fixed; JAN TF1AO4YY 1 coil 4.0 H, 0.5 A, 40 ohms dc 2500 V rms test; 4-1/4 in. lg, 3-3/4 in. w, 3-1/2 in. h, terms. 13/16 in. h; MIL-T-27; CBIK No. 3931	Filter choke bias supply
L-505		Same as L-504	Filter choke bias supply
L-601		REACTOR: fixed; JAN TF1AO4YY; 1 coil, 2.0 H, 150 ma, 60 ohms dc, 2500 V rms test; 2-1/4 in. lg, 2-1/8 in. w, 3-1/2 in. h, terms. 13/16 in. h; MIL-T-27; CBIK No. 3956	Dial line filter
L-801		Same as L-102 except p/o T-801	V-801, V-802 plate feed
L-804		COIL, RF: 58 turns; single layer close wound; 34 AWG Cu; enameled, nylon covered; 10.3 mh; CBIK No. 3780	p/o T-802
L-807		COIL, RF: 46 turns; 32 AWG Cu; enameled, nylon covered; CBIK No. 3777	p/o Z-801
L-808		Same as L-102 except p/o Z-801	V-803 plate decoupling
L-809		COIL, RF: 36 AWG, 22-ohm; 1.0 mh, p/m 10%; 100 ma; unshielded; CNA No. R-50PT-2; (p/o Z-801)	V-804 grid
L-810		Same as L-102 except p/o Z-802	V-804 plate
L-811		COIL, RF: 46 turns of #32 copper wire, enameled, nylon insulation; tap after 6 turns; CBIK Dwg 3810, part of Z-802	V-804 output transformer
L-812		Same as L-102	V-807 plate phase modulation feed
L-815		CHOKE, RF: layer, 5 pi; 40 AWG, nylon enamel ins; 380 turns per pi on 1/2 in. OD form CAMQ Type LS7; core Stackpole Type SK-61; 80 KC w/ 146 mmf; windings 7/8 in. lg OA; CBIK No. 3766	V-808 grid osc. tuning
L-816		CHOKE, RF: layer, 3 pi; 40 AWG, nylon enamel ins; gears 100-49, cam 0.109; 420 turns per pi on 9/32 in. OD phenolic form; 200 Kc w/ 59 mmf; windings 1 in. lg OA; CBIK No. 3765	T-803 phasing

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
L-817		Same as L-816	T-803 phasing
L-818		COIL, RF: layer, 2 pi; 5.5 ohms dc 75 ma, 0.1 mh; CNA Type R-33-0SA3003	V-811 grid filter
L-819		Same as L-818	V-811 grid filter
L-901		Same as L-102	Grid V-901
L-902		Same as L-102	Cathode V-901
L-903		COIL, RF: single; 35 uh; 145 turns; 32 AWG Cu; formex ins; coil 15/32 in. lg, form 1 in. lg, 1/4 in. OD; CBIK No. 4103	Plate V-901
L-904		Same as L-903	Grid V-902
L-1101		COIL, RF: single; 50 turns; 30 AWG Cu; nylon ins; coil 5/8 in. lg, form CAMQ Type LS7; CBIK No. 3773-1	V-1101 plate tuning
L-1102		COIL, RF: single; 21 turns; 28 AWG Cu; nylon ins; coil 5/8 in. lg, form CAMQ Type LS7; CBIK 3773-2	V-1101 plate tuning
L-1103		COIL, RF: single; 30 turns; 28 AWG Cu; nylon ins; coil 5/8 in. lg, form CAMQ Type LS7; CBIK No. 3773-3	V-1101 plate tuning
L-1104		CHOKE, RF: single; 4 turns; 20 AWG Cu; wound about R-1106; CBIK No. 4337-1	V-1102 grid decoupling
L-1105		COIL, RF: single; 22 turns; 28 AWG Cu; nylon ins; coil 5/8 in. lg, form CAMQ Type LS7; CBIK No. 3773-4	V-1102 plate tuning
L-1106		COIL, RF: single; 7 turns; 22 AWG Cu; nylon ins; coil 5/8 in. lg, form CAMQ Type LS7; CBIK No. 3773-5	V-1102 plate tuning
L-1107		COIL, RF: single; 12 turns; 28 AWG Cu; nylon ins; coil 5/8 in. lg, form CAMQ Type LS7; CBIK No. 3773-6	V-1102 plate tuning
L-1108		Same as L-102	V-1103 grid decoupling

L-1109		Same as L-1104 except wound about R-1120; CBIK No. 4337-2	V-1103 grid decoupling
L-1110		COIL, RF: single; 30 turns; 22 AWG Cu; enamel ins; coil 1 in. lg, 15/16 in. ID; form 2-1/2 in. lg, 1 in. OD; CBIK No. 3788-1	V-1103 plate tuning
L-1111		COIL, RF: single; 19 turns; 22 AWG Cu; enamel ins; coil 1-3/4 in. lg, 15/16 in. ID; form 2-1/2 in. lg, 1 in. OD; CBIK No. 3788-2	V-1103 plate tuning
L-1112		COIL, RF: single; 8-1/2 turns; 14 AWG Cu; enamel ins; coil 1-1/8 in. lg, 15/16 in. ID; form 2-1/2 in. lg, 1 in OD; CBIK No. 3788-3	V-1103 plate tuning
L-1113		COIL, RF: single; 4-1/2 turns; 12 AWG Cu; enamel ins; coil 3/4 in. lg, 15/16 in. ID; form 2-1/2 in. lg, 1 in. OD; CBIK No. 3788-4	V-1103 plate tuning
L-1114		COIL, RF: single; 3-1/2 turns; 12 AWG Cu; enamel ins; coil 1-1/8 in. lg, 15/16 in. ID; form 2-1/2 in. lg, 1 in. OD; CBIK No. 3788-5	V-1103 plate tuning
L-1115		CHOKE, RF: 600 ma; 7-35 Mc; 44 uh; 2 in. lg, 7/16 in. OD; COM No. Z-14	V-1103 plate decoupling
L-1116		Same as L-102	V-1104/5 grid decoupling
L-1117		Same as L-1104 except wound about R-1130; CBIK No. 4337-3	V-1105 grid suppressor
L-1118		Same as L-1104 except wound about R-1131; CBIK No. 4337-4	V-1104 grid suppressor
L-1119		COIL, RF: single; 3-1/2 turns; 18 AWG Cu; formex ins; 1/4 in. lg, 7/16 in. ID; 2 in. lg leads; CBIK No. 4324	V-1102 plate tuning
L-1120		Same as L-1104 except wound about R-1183; CBIK No. 4337-5	V-1103 plate suppressor
L-1301		Same as L-1115	V-1104/5 plate decoupling
L-1302		COIL, RF: single; 4-1/2 turns; 3/16 in. O.D.; 1/8 in. ID; Cu sil pl tubing; 1 tap at 1-1/2 turns; coil 1-1/4 in. lg, 1-1/4 in. ID, 1-5/8 in OD; CBIK No. 3808	V-1104/5 plate tank coil
L-1303		COIL, RF: single; 13 turns; 14 AWG Cu; enamel ins; 2 taps, 4 and 7-1/4 turns; coil 1-1/2 in. lg, 1-3/16 in. ID, form 4 in. lg, 1-1/4 in. OD; CBIK No. 3801	V-1104/5 plate tank coil
L-1304		COIL, RF: single; 29 turns; 16 AWG Cu; enamel ins; 2 taps 10 and 18 turns; coil 2-3/4 in. lg, 1-15/16 in. ID, form 4-3/8 in. lg, 2 in. OD; CBIK No. 3803	V-1104/5 plate tank coil

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
L-1305		COIL, RF: single; 256 turns; 34 AWG Cu; enamel ins; close wound; mycalex form; 7-1/2 in. lg, 1/2 in. dia; CBIK No. 3809	V-1301/2 grid decoupling
L-1306		COIL, RF: single; 3/4 turns; 18 AWG Cu; no ins; 2-3/4 in. lg before turn; CBIK No. 4100, (u/w R-1301)	V-1302 grid suppressor
L-1307		Same as L-1306 except u/w R-1302	V-1301 grid suppressor
L-1308		COIL, RF: 1 turn; 10 AWG Cu buss; no ins; CBIK No. 4101, (u/w R-1324)	V-1301 plate suppressor
L-1309		COIL, RF: single; 1-1/2 turns; 10 AWG Cu; no ins; 1 in. lg, 1-1/2 in. dia c/c of wire; CBIK No. 3806	V-1301/2 plate suppressor
L-1310		Same as L-1308 except u/w R-1323	V-1302 plate suppressor
L-1311		Same as L-1301	V-1301/2 screen suppressor
L-1312		COIL, RF: single; 6 turns; 3/8 in. dia, Cu sil pl; 3 taps, at 1, 2 and 4 turns; 5-5/8 in. dia, 5-5/8 in. lg; CBIK No. 3847	P. A. IF plate coil
L-1313		COIL, RF: single; 10-1/2 turns; 5/16 in. dia, Cu sil pl; 6 in ID, 5-1/2 in. lg; CBIK No. 3647	P. A. LF plate coil
L-1314		COIL, RF: single tapered; 2-3/4 turns; 5/8 in. dia, Cu sil pl; 2 taps at 9/10 and 1-4/5 turns; 4-7/8 in. max ID, 2-5/8 in. min. ID, 2-7/16 in. lg; CBIK No. 3812	P. A. HF plate coil
L-1401		COIL, RF: single; 13 turns; 5/16 in. dia, Cu sil pl; 2 taps at 3 and 5 turns; 6 in. ID, 6-7/8 in. lg; CBIK No. 3860	Output LF coil
L-1402		COIL, RF: single; 6-1/2 turns; 3/8 in. dia, Cu sil pl; 3 taps at 2, 4 and 5 turns; 4-7/8 in. ID, 5-3/4 in. lg; CBIK No. 3866	Output IF coil
L-1403		COIL, RF: single tapered; 3 turns; 5/8 in. dia, Cu sil pl; 2 taps at 3/4 and 1-1/2 turns; 4-3/8 in. max ID, 2-7/8 in. min ID, 3-13/32 in. lg; CBIK No. 3844	Output HF coil

M-401			METER, audio level: panel mtd; AC rect type; one scale marked db, grad in log scale, -10 to +4; 3-1/2 in. dia; p/m 2% full scale accuracy; self contained; CMY No. 53 RN	Volume indicator
M-402			AMMETER: panel mtd; one scale marked CHANNEL, grad in units from OFF to 10; 3-1/2 in. dia; p/m 2% full scale accuracy; 1 ma movement; u/w R-402 and R-408 multiplier; CMY No. 53 RN	Channel indicator
M-801			AMMETER: JAN MR25W005DCMA; panel mtd; DC; one scale marked MILLIAMPERES, grad in. 1 maincrements from 0 to 5; 2-1/2 in. dia; p/m 2% full scale accuracy; shunted by R-832 (PLATE position), R-891 (GRID pos); also u/w multipliers R-823/24, R-826/27 in GRID pos; per JAN-I-6; CMY No. 52 RN	V-804 tuning
M-901			AMMETER: panel mtd; DC; two scales both marked MILLIAMPERES, grad on one scale in 1 ma increments from 0 to 50 and on other scale in .2 ma increments from 0 to 10; 3-1/2 in. dia; p/m 2% full scale accuracy; 1 ma movement; u/w multipliers R-902, R-910 in AMP position and R-902, R-905 in OSC pos; CMY No. 53 RN	Osc. - amp.
M-1001			VOLTMETER: JAN MR35W300DCVV; panel mtd; DC; one scale marked VOLTS DC, grad in 10 Vincrements from 0 to 300; 3-1/2 in. dia; p/m 2% full scale accuracy; 1000 ohms per volt; self contained; per JAN-I-6; CMY No. 53 RN	Output indicator
M-1101			AMMETER: JAN MR35W010DCMA; panel mtd; DC; one scale in increments of .2 ma from 0 to 10; 3-1/2 in. dia; p/m 2% full scale accuracy; R-1111 (position 1), R-1118 (pos 2), R-1126 (pos 3), R-1127 (pos 4); per JAN-I-6; CMY No. 53 RN	Excitor tracking indicator
M-1501			METER, audio level: panel mtd; AM indicator; one scale marked PERCENT MODULATION, grad in 2% increments from 0 to 100; 3-1/2 in. dia; p/m 2% full scale accuracy; 1 ma movement; u/w external recitifier CR-301; CMY No. 53 RN	Percent modulation
M-1502			VOLTMETER: JAN MR35W005DCKV; panel mtd; DC; one scale marked KILOVOLTS, grad in 100 V increments from 0 to 5; 3-1/2 in. dia; p/m 2% full scale accuracy; 1 ma movement; u/w external multiplier; per JAN-I-6; CMY No. 53 RN	P. A. - mod. plate
M-1503			AMMETER: JAN MR35W002DCMA; panel mtd; DC; one scale marked AMPERE, grad in .05 amp increments from 0 to 2; 3-1/2 in. dia; p/m 2% full scale accuracy; u/w shunt R-340; per JAN-I-6; CMY No. 53RN	Modulator cathode

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
M-1504		VOLTMETER: panel mtd; AC, rectifier type, 50/60 cps, one phase; two scales both marked AC VOLTS, one scale grad in 10 V increments from 0 to 300, second scale grad in 0.2 V increments from 0 to 8; 3-1/2 in. dia; p/m 2% full scale accuracy; 1000 ohms per volt; self contained; CMY No. 53RN	Fil. - line test
M-1701		AMMETER: JAN MR35W200DCMA; panel mtd; DC; one scale marked MILLIAMPERES, grad in 5 ma increments from 0 to 200; 3-1/2 in. dia; p/m 2% full scale accuracy; self contained; per JAN-I-6; CMY No. 53RN	IPA plate
M-1702		Same as M-1701	P. A. grid
M-1703		AMMETER: JAN MR35W800 DCMA; panel mtd; DC; one scale marked MILLIAMPERES, grad in 20 ma increments from 0 to 800; 3-1/2 in. dia; p/m 2% full scale accuracy; self contained; per JAN-I-6; CMY No. 53RN	P. A. screen
M-1704		Same as M-1503 except u/w shunt R-1305/15, R-1317/21	P. A. cathode
N-101		DIAL SCALE ASSEMBLY: dial on 96W-1, output tuning indicator; black finish alum mtd on br bushing and gear sub-assy; dial is 2-7/8 in. dia, 1/32 in. thk; reverse etched characters reading 2.0, 2.5, 3.0, 3.5, 4.0, 4.5 w/ increments every 0.05 units; gear is spur type, 90 teeth, 14-1/2° press. angle, br, 1-7/8 in. P.D., 48 pitch, 1/32 in. face; hub is br 1-1/4 in. max OD, 5/8 in. OD at AA hub end, 7/16 in. from end of AA hub to gear face, 11/32 in. bore; CBIK No. 4222-2	Indicator output tuning
N-102		DIAL SCALE ASSEMBLY: vernier dial on 96X-1, interpolation osc tuning indicator; black finish alum mtd on bushing of br gear; 2-1/8 in. dia, 1/32 in. thk; reverse etched characters reading 0, 100, 200, 300, and 400 w/ increments every 10 units; gear is spur, 66 teeth, 14-1/2° press. angle, 1-3/8 in. P.D., 48 pitch; CBIK No. 4181-2	Indicator interpolation OSC, vernier
N-103		DIAL SCALE ASSEMBLY: vernier dial on 96X-1 master osc tuning indicator; alum mtd on bushing of br gear; outer scale black finish, inner scale red finish, 2-1/8 in. dia, 1/32 in. thk; reverse etched characters reading 0, 10, 20, 30, 40 repeated twice on outer scale, and 0, 10, 20, 30, 40 repeated once on inner scale, w/ increments every 2 units on each scale; CBIK No. 4181-1	Indicator master osc. vernier

ORIGINAL

N-104		DIAL SCALE ASSEMBLY: coarse dial on 96X-1 interpolation osc tuning indicator; alum riveted to br gear and hub; scale reads from 0 to 5000 in increments of 500 units; black finish, reverse etched; 2-13/16 in. dia, 1/32 in. thk; gear is spur type, 140 teeth, 14-1/2° press. angle, br, 2.914 in. P.D., 48 pitch, 0.046 in. face and length; hub is br, 7/8 in. max OD, 7/16 in. OD at AA hub end, 19/64 in. from end of AA hub to gear face, 0.341 in. bore; CBIK No. 4184-2	Indicator interpolation osc. tuning coarse dial
N-105		DIAL SCALE ASSEMBLY: coarse dial on 96X-1 master osc tuning indicator; alum riveted to br gear and hub; outer scale red finish, inner scale black finish; 2-13/16 in. dia, 1/32 in. thk; reverse etched characters reading 2.00 to 3.00 in increments of 0.10 on outer dial, and 3.00 to 4.50 in increments of 0.10 on inner scale; gear is spur type, 140 teeth, 14-1/2° press. angle, br, 2.914 in. P.D., 48 pitch, 0.046 in. face and length; hub is br, 7/8 in. max OD, 7/16 in. OD at AA hub end, 19/64 in. from end of AA hub to gear face, 0.341 in. bore; CBIK No. 4184-1	Indicator master OSC tuning coarse dial
N-801		DIAL SCALE ASSEMBLY: dial on 96W-1 RF tuning indicator in frequency shift keyer unit; black finish alum mtd on br bushing and gear sub-assy; dial is 2-7/8 in. dia, 1/32 in. thk; reverse etched characters reading 2.0, 2.5, 3.0, 3.5, 4.0 w/ increments every 0.05 units; gear is spur type 90 teeth, 14-1/2° press. angle, br 1-7/8 in. P.D., 48 pitch, 1/32 in. face; hub is br 1-1/4 in. max OD, 5/8 in. OD at AA hub end 7/16 in. from end of AA hub to gear face, 11/32 in. bore; CBIK No. 4222-1	Dial tuning assembly
N-1101		DIAL SCALE: exciter tuning indicator on 96L-5 tuning dr; black finish w/ reverse etched characters from 0 to 100 in steps of ten; 3-5/16 in. dia; 1/32 in. thk; 9/16 in. bore w/ three 0-096 in. holes spaced 120° apart on 3/8 in. radius; CBIK No. 3952	Excitor tuning indicator
N-1301		DIAL SCALE: IPA plate and PA grid tuning indicator on 96L-5 tuning dr in power amplifier unit; black finish w/ reverse etched characters from 0 to 100 in steps of ten w/ increments every two units; 3-5/16 in. dia, 1/32 in. thk; 9/16 in. bore w/ three 0.096 in. holes spaced 120° apart on 3/8 in. radius; CBIK No. 3957	IPA plate and PA grid tuning indicator
N-1302		DIAL SCALE: PA plate tuning indicator on 96L-6 tuning dr in power amplifier unit; black finish w/ reverse etched characters from 0 to 90 in steps of ten w/ increments every two units; 3-5/16 in. dia 1/32 in. thk; 9/16 in. bore w/ three 0.096 in. holes spaced 120° apart on 3/8 in. radius; CBIK No. 3958	PA plate tuning indicator
N-1401		DIAL SCALE: loading tuning indicator on 96L-6 tuning dr in antenna matching network; black finish w/ reverse etched characters reading 0, 20, 40, 60, 80, 100 w/ increments every ten units; 3-5/16 in. dia, 1/32 in. thk; 9/16 in. bore w/ three 0.096 in. holes spaced 120° apart on 3/8 in. radius; CBIK No. 3959	Load tuning indicator

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
N-1402		DIAL SCALE: coupling indicator on 96L-5 tuning dr in antenna matching network; two scales, outer black finish, inner red finish, both reverse etched; outer scale reads from 0 to 90 in steps of ten w/ increments every two units; inner scale reads from 0 to 90 in steps of ten; 3-5/16 in. dia, 1/32 in. thk; 9/16 in. bore w/ three 0.096 in. holes spaced 120° apart on 3/8 in. radius; CBIK No. 3961	Coupling indicator
N-1403		DIAL SCALE: series tuning indicator on 96L-5 tuning dr in antenna matching network; black finish w/ reverse etched characters reading from 0 to 90 in steps of ten w/ increments every two units; 3-5/16 in. dia, 1/32 in. thk; 9/16 in. bore w/ three 0.096 in. holes spaced 120° apart on 3/8 in. radius; CBIK No. 3960	Series tuning indicator
O-101		KNOB: phenolic; black; 1-5/8 in. dia, 1-9/32 in. thk; no markings; CAQN No. D-401	Interpolation oscillator tuning
O-102		Same as O-101	Master oscillator tuning
O-103		Same as O-101	Output tuning
O-105		GEAR, spur: 36 teeth, 14-1/2° press. angle, br; 3/4 in. P.D., 48 pitch, 1/8 in. face, 3/16 in. bore; CBH No. G-139	Idler for N-101
O-106		GEAR, spur: 66 teeth, 14-1/2° press. angle, br; 1-3/8 in. P.D., 48 pitch, 1/8 in. face 3/8 in. lg, 0.625 in. OD of AA hub end, 1/4 in. from end of AA hub to gear face; CBIK No. 4175	Idler for N-102
O-106A		Same as O-106	Idler for N-103
O-107		GEAR, spur: 26 teeth, 14-1/2° press. angle, br; 13/24 in. P.D., 48 pitch, 1/8 in. face; gear mtd on shaft 1-27/64 in. lg, 1/4 in. OD one end, other end is 1/8 in. dia and 23/64 in. lg w/ 0.012 in. wide snap ring groove; first projection is 15/16 in. lg from face of gear; CBIK No. 4193	Idler for N-101
O-108		GEAR, worm: straight; u/w O-109; single thread, 5/8 in. face, 20° press. angle, 0.4334 in. P.D., 32 pitch, right thread, 4 deg 8 min., hardened, 0.1875 in. bore; COL No. 502 6472 002	Drive gear for output tuning
O-109		DRIVE, tuning: auto position mech; 10 mech dr channels; 4 to 5 in. /lb; single turn; -45° C to +60° C; 1 lb 4 oz weight; three mtg holes for 6-32 sc; 2.875 lg, 1.946 in. w, 4.080 in. d; COL No. 96W-1	Output tuning master osc.

O-110		DRIVE, tuning: auto position mech; 10 mech dr channels; 3 to 4 in. /lb; multiturn; -45° C to +60° C; 2 lb 4 oz weight; three mtg holes for 6-32 sc; 3.655 in. lg, 2.875 in. w, 4.080 in. d; COL No. 96X-1	Interpolation oscillator tuning head
O-110A		Same as O-110	Master oscillator tuning head
O-111		CONTROL UNIT: drive for ckt seeking sw, limit sw, interlocks; 10 mech'l sought channels; 1 lb 3 oz weight; requires 48V dc, 35W; supplied w/ 12 in. cable, 18 cont male plug; 2.728 in. lg, 2.222 in. w, 2.046 in. d; three mtg holes for 5-40 sc; COL No. 111C-4	Off line shaft
O-112		CHAIN: American std No. 25 rollerless; u/w link 0-120; 1/4 in. pitch, 0.110 in. face, 1/8 in. bushing width; 0.130 in. bushing dia; 0.0905 in. pin dia; furnished in one ft length; CBH No. 25	Motor to line shaft drive
O-113		SPROCKET: 1/4 pitch; 17 teeth; 0.110 in. face; 1.490 in. OD; 5/16 in. bore; 1 in. hub dia; CBIK No. 4004-4	Motor shaft
O-114		SPROCKET: 1/4 pitch; 24 teeth; 0.110 in. face; 2.50 in. OD; 0.187 in. bore; 1-3/8 in. hub dia; CBIK No. 4004-3	Line shaft
O-115		BEARING, ball, annular: single row; 3/16 in. bore; 1/2 in. OD; class 1 tol: CGM No. 77R3	Support and anti-friction line shaft
O-116		BEARING, ball, thrust: single row, staggered, ball shape; flat race; double direction; rigid; 3/16 in. bore; 5/8 in. OD; 1/4 in. wide; bore tol is 0.005 in. max 0.002 in. min, OD tol is +0.000 in. max — 0.005 in. min, width tol is +0.000 in. max — 0.010 in. min; CBH No. A03	Line shaft thrust bearing
O-117		GEAR, spur, compound: gear No. 1, 90 teeth, 14-1/2° press. angle, br, 1-7/8 in. P.D., 48 pitch, 1/32 in. face; gear No. 2, 16 teeth, 14-1/2° press. angle, br, 1/2 in. P.D., 48 pitch, 1/8 in. face; gears on common br hub 17/32 in. lg w/17/64 in. shaft projection from gear face, 1/8 in. dia w/ 0.012 in. wide snap ring groove; CBIK No. 4233	Drive to N-102
O-117A		Same as O-117	Drive to N-103
O-118		GEAR, worm: straight; u/w 0-110; single thread, 11/16 in. face, 20° press. angle, 0.3816 in. P.D., 34 pitch, right thread, 17 deg 57 min. helix angle, hardened, 0.1875 in. bore; COL No. 502 6499 002	Drive for interpolation osc. tuning
O-118A		Same as O-118	Drive for master osc. tuning

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
O-119		GEAR, worm: straight; u/w 0-111; 0.437 in. face, 14-1/2° press. angle, 0.335/.334 in. P.D., 48 pitch, 0.06558 lead, left thread, 3 deg 34 min., hardened, 0.1875 in. bore; COL No. 504 0641 002	Drive for 111C control unit
O-120		LINK, connecting: u/w chain 0-112; 1/4 in. pitch; CBH No. 25	0-112 connecting link
O-121		BEARING, ball: single row, radial; 0.315 in. bore, 0.8861 in. OD, 0.406 in. w; cl 1 tol; CGM No WC-87038-X1E, (maint item for B-101)	B-101 shaft support and anti-friction
O-122		BEARING, ball: single row, radial CGM No. 7R3, (maint item for B-102)	B-102 shaft support and anti-friction
O-123		BAR, locking: stainless steel shaft pressed in alum wing nut; 2-1/4 in. lg, 3/16 in. dia shaft, 1 in. w nut; COL No. 502-1829-002	p/o O-109
O-124		Same as O-123	p/o O-110
O-125		Same as O-123	p/o O-110/A
O-309		CHIMNEY: air funnel for V-309; glass; 7-3/8 in h, 6-1/8 in. dia; CIM No. 4-1000A/4006 w/clips	V-309 air chimney
O-310		Same as O-309 except u/w V-310	V-310 air chimney
O-311		KNOB: phenolic; black; 1-1/8 in. dia. 5/8 in. thk; with mechanically attached pointer, br, ni pl, 3/4 in. lg; no markings; CAUP No. S-308-64-BB-40281	Input gain
O-312		Same as O-311	MCW gain
O-313		Same as O-311	Limiter gain
O-408		Knob: phenolic; black; 1-1/8 in. dia, 5/8 in. thk; no markings; CAUP No. S-308-64-BB	Gain

O-501		KNOB: phenolic; black; 1-3/8 in. dia, 11/16 in. thk; no markings; with mechanically attached pointer, br, ni pl, 1-1/16 in. lg; CAUP No. S-385-64-BB-40261	PA plate voltage
O-508 thru O-511		CLIP, electrical, resistor mounting, Style 2 MBCA Ref Dwg 37; 60 amp, 600 V with "U" side support, less insulating paper, Specialties Inc. Pittsburg, Pa. No. C23	Power resistor mounting
O-701		KNOB: phenolic; black; 11/16 in. dia, 7/16 in. thk; no markings; molded pointer 1/2 in. lg; Harry Davis Molding Co., Chicago, Ill. No. 1400 mod. CBIK 3920	Channel repeater
O-702 thru O-711		Same as O-701	Channel switches 1 thru 10
O-712		KNOB: phenolic; black; 11/16 in. dia, 7/16 in: thk; no markings; molded pointer 1/2 in. lg; CBIK No. 3919	Excitation select
O-801		Same as O-311	Phase modulation
O-802		Same as O-311	Carrier mark, space, FSK, photo
O-803		Same as O-408	Photo calibration
O-804		KNOB: phenolic; black; 1-5/8 in. dia, 3/4 in. thk; no marking; CAUP No. S-309-64-BB	R. F. tuning
O-807		KNOB: phenolic; black; 1-3/8 in. dia, 23/32 in. thk; no markings with mechanically attached skirt, 2 in. dia, engraved 0 to 100, counter-clockwise, 270 degrees; CAQN No. D202	Deviation
O-808		Same as O-109	R. F. tuning
O-809		Same as O-111	Off line shaft
O-810		Same as O-119	Drive for O-809
O-811		SPROCKET: 1/4 pitch; 12 teeth; 0.110 in face; 0.97 in. P.D.; 5/16 in. bore; 3/4 in. hub dia; CBIK No. 4004-2	Motor shaft
O-812		SPROCKET: 1/4 pitch; 16 teeth; 0-110 in. face; 1.28 in. P.D.; 3/16 in. bore; 13/16 in. hub dia; CBIK No. 4004-1	Line shaft

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
O-814		Same as O-108	Line shaft
O-815		Same as O-107	Dial drive
O-816		Same as O-112	Motor to line shaft drive
O-817		Same as O-120	O-816 connecting link
O-818		Same as O-105	Dial drive
O-819		Same as O-121	B-801 shaft support and anti-friction
O-820		Same as O-123	Locking bar for RF tuning
O-904		Same as O-701	Crystal selector
O-1001		Same as O-311	-105, +240, +160
O-1106		Same as O-311	Meter switching
O-1109		OVER-TRAVEL CONTROL: one COL type 505 2695 002 limit sw; COL No. 505 2695 002	Autotune overtravel control
O-1109A		GEAR AND CLUTCH: worm gear and friction clutch mtd common shaft; 1-7/8 in. lg, 1-1/2 in. w OA; COL No. 505 2694 002	p/o O-1109
O-1110		BEARING, ball, annular: single row; 1/4 in. bore; 11/16 in. OD; class 1 tol; CBH No. 1602DS (NICE)	Support and anti-friction cross shaft
O-1111		BEARING, ball, annular: single row; 3/16 in. bore; 11/16 in. OD; class 1 tol; CBH No. 1601DS (NICE)	Support and anti-friction cross shaft
O-1112		DRIVE, tuning: auto position mech; 10 mech dr or manually oper channels: 24 in. /lb; 0 to 345 deg rot; 25° C to +50° C op temp; 6 lbs weight; three mtg holes for 8-32 sc; 4.062 in. lg, 3.250 in. w, 4-7/8 in. d less knob; COL No. 96L-4 modified by removal of spline from drive shaft; COL No. 96L-5	Automatic tuning device

O-1114		CONTROL UNIT: drive for ckt seeking sw, channel indicator meter sel sw; 10 mech'l sought channels; 1 lb 2 oz weight; mech'l pwr operated; 2-29/32 in. lg, 3 in. d less shaft; three mtg holes for 6-32 sc; COL No. 103C-11	Switch positioning control
O-1115		DRIVE SHAFT ASSEMBLY: No. 303 stainless st. rod per AN-S-771; 8-1/4 in. lg, 1/2 in. max OD; has 3/16 in. dia by 7/8 in. lg pin in each end w/ bearing retainers, ball bearings, a collar and a helical gear between ends; ball bearings are CBH No. 1607DS, 29/32 in. OD; helical gear is CBH No. H-2015R, 15 teeth, 3/8 in. face, 20 pitch, 0.75 in. P.D., 14-1/2° press. angle, 45° helix w/ a 1/8 in. by 1/16 in. keyway in 7/16 in. bore; CBIK No. 4157	Line shaft assembly excitor autotune drive
O-1116		GEAR, worm: single thread; 0.437 in. face, 20° press. angle, 0.3333 in. P.D., 48 pitch, 0.065 in. lead, right thread, 3 deg 33 min; 0.3750 in. OD, 0.1875 in. bore; u/w COL No. 505 2694 002 gear and clutch assy; COL No. 507 5513 00	Power transfer to O-1109A
O-1117		Same as O-108 except u/w O-1114	Power transfer to O-1114
O-1118		GEAR, worm: straight; single thread; 1.102 in. face, 20° press. angle, 0.483 in. P.D., right thread, 4.952° helix angle; 1/4 in. bore; 3/32 in., 0.10 in. keyway on end; COL No. 500 7525 002	Power transfer to O-1112
O-1119		GEAR, helical: single tooth type; 20 teeth, 3/8 in. face, 14-1/2° press. angle, 1.0 in. P.D., 20 pitch, 45° helix angle, right thread, hardened; 1/2 in. bore; 1/8 in., 1/16 in. keyway; CBH No. H2020R	Power transfer to cross shaft
O-1120		BAR, locking: stainless steel shaft pinned to black finish steel bar; 2-1/16 in. lg OA, 1/4 in. dia shaft, bar is 1-7/8 in. lg by 1/2 in. w by 3/8 in. thk; COL No. GA-2265A	p/o O-1112
O-1301 thru O-1320		KNOB: phenolic; block; 11/16 in. dia, 7/16 in. thk; branded arrow marking, white enamel filled; Harry Davis Molding Co., Chicago, Ill. No. 1450 AN	Channel band selectors
O-1321		Same as O-309 except u/w V-1310	P. A. tube cooling
O-1322		Same as O-309 except u/w V-1302	P. A. tube cooling
O-1323		DRIVE ASSEMBLY: mech'l dr for vacuum capacitor C-1307; c/o casting w/ two parallel dr shafts, sprockets chain connected, resistor R-1316, capacitor C-1307, and a flexible cable coupling to C-1307; CBIK No. 4146	C-1307 mounting and drive assembly
O-1325		Same as O-1119	Power transfer gear to cross shaft

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
O-1326		BEARING, ball, annular: single row; 1/4 in. bore; 3/4 in. OD; class 1 tol; CGM No. 77R4A	Support and anti-friction cross shaft
O-1327		GEAR, spur: 128 teeth, 14-1/2° press. angle, br; 4 in. P.D., 32 pitch, 3/16 in. face, 1/2 in. lg, 3/4 in. OD of AA hub end, 5/16 in. from end of AA hub to gear face; CBIK No. 3607	C-1301 drive
O-1328		GEAR, spur, assembly: two spring loaded gears; each 80 teeth, 14-1/2° press. angle, br; 2-1/2 in. P.D., 32 pitch, 1/16 in. face, 5/8 in. lg, 5/8 in. OD of AA hub end, 11/32 in. from end of AA hub to gear face; 0.375 in. bore; CBIK No. 4061	C-1301 drive
O-1330		Same as O-1118	Power transfer to O-1332
O-1330A		Same as O-1118	Power transfer to O-1333
O-1331		Same as O-1115	Line shaft assembly P. A. autotune drive
O-1332		DRIVE, tuning: auto position mech; 10 mech dr or manually op channels; 24 in. /lb; 0 to 345 deg rot.; -25° C to +50 °C op temp; 6 lbs weight; three mtg holes for 8-32 sc; 4.062 in. lg, 3.250 in. w, 5-15/16 in. d less knob; COL No. 96L-4 modified by removal of spline from drive shaft and 1-1/16 in. projection on cam and stop washer shaft; COL No. 96L-6	C-1301 automatic tuning device
O-1333		Same as O-1112	C-1307 automatic tuning device
O-1334		CABLE ASSEMBLY, flexible: st steel; 7 strands of 19 wires each per AN-C-44; 7 in. lg inc. stud, 1/16 in. wire dia; No. 10-32 stud screw; CBIK No. 4143	C-1307 drive coupling
O-1335		COUPLING FLEX: Steatite Insul CBK PL5010	C-1301 & C-1307 drives
O-1336		Same as O-1120	p/o O-1332
O-1337		Same as O-1120	p/o O-1333

O-1401		Same as O-1301	[illegible]
O-1402 thru O-1411		Same as O-1301	Fixed load capacitor selectors
O-1413		DRIVE SHAFT ASSEMBLY: No. 303 stainless st. rod per AN-S-771; 8-5/8 in. lg, 1/2 in. max OD; has 3/16 in. dia by 7/8 in. lg pin in one end followed by a bearing retainer, ball bearing, helical gear and collar, collar and ball bearing; ball bearings are CBH No. 1607DS, 29/32 in. OD; helical gear is CBH No. H-2015R, 15 teeth, 3/8 in. face, 20 pitch, 0.75 in. P.D., 14-1/2° press. angle, 45° helix angle w/ a 1/8 in. by 1/16 in. keyway in 7/16 in. bore; CBIK No. 4172	Line shaft assembly power amplifier autotune
O-1414		DRIVE ASSEMBLY: mech'l dr for vacuum capacitor C-1401; c/o casting w/ two parallel dr shafts, pulleys chain connected, and a flexible cable coupling to C-1401; CBIK No. 4148	C-1401 mounting and drive assembly
O-1415		Same as O-1326	Support and anti-friction cross shaft
O-1416		BEARING, ball, annular: single row; 3/8 in. bore; 7/8 in. OD; class 1 tol; CGM No. 77R6	Support and anti-friction coupling drive
O-1417		GEAR, rack: br; 9 in. lg, 3/16 sq; 32 pitch, 14-1/2° press. angle; CBH No. G-583 mod for installation per CBIK No. 4204	Coupling drive
O-1418		BEARING, ball, annular: single row; 3/8 in. bore; 29/32 in. OD; class 1 tol; CBH No. 1606DS (NICE)	Support and anti-friction coupling drive
O-1419		GEAR, spur: 20 teeth, 14-1/2° press. angle, br; 11/16 in. OD, 5/8 in. P.D., 32 pitch, 3/8 in. face, 3/8 in. bore 17/32 in. dia, 1/4 in. lg hub; CBIK No. 4275	Coupling drive
O-1420		Same as O-1118	Power transfer to O-1427
O-1421		Same as O-1119	Drive cross shaft
O-1422		GEAR, bevel: straight; 36 teeth; 1/4 in. face, 14-1/2° press. angle, 1-1/2 in. P.D., 24 pitch; right thread, br; 1.540 in. OD, 1/4 in. bore, 33/64 in. lg, 3/8 in. backing to pitch line; No. 4-36 tapped hole 1/2-way thru hub and 1/8 in. from end; CBIK No. 3690-2	Coupling drive

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
O-1423		GEAR, bevel: straight; 36 teeth, 1/4 in. face, 14-1/2° press. angle, 1-1/2 in. P. D., 24 pitch, right thread, br; 1. 540 in. OD, 1/4 in. bore, 33/64 in. lg, 3/8 in. backing to pitch line; No. 52 drill hole 1/2-way thru hub and 1/8 in. from end; CBIK No. 3690-1	Drive coupling
O-1424		GEAR, bevel: straight; 18 teeth, 1/4 in. face, 14-1/2° press. angle, 3/4 in. P. D., 24 pitch, right thread, br; 0. 820 in. OD, 3/16 in. bore, 35/64 in. lg, 5/16 in. backing to pitch line; CBIK No. 3689-1	Drive coupling
O-1425		GEAR, bevel: straight; 18 teeth, 1/4 in. face, 14-1/2° press. angle, 3/4 in. P. D., 24 pitch, right thread, br; 0. 820 in. OD, 3/8 in. bore, 35/64 in. lg, 5/16 in. backing to pitch line; CBIK No. 3689-2	Drive coupling
O-1426		Same as O-1332	Load tuning auto-tune lead
O-1427		Same as O-1112	Coupling plate autotune head
O-1427A		Same as O-1112	Series tuning autotune head
O-1428		Same as O-1334	C-1401 drive coupling
O-1429		Same as O-1120 except u/w O-1426	p/o O-1426
O-1430		Same as O-1120 except u/w O-1427	p/o O-1427
O-1431		Same as O-1120 except u/w O-1427A	p/o O-1427A
O-1501		Same as O-701	Service meter range selector
O-1502		IMPELLER: forward curve; steel; zinc finish; single width; 36 paddles; cw; 6-5/16 in. dia, 2 in. w; hub is single inside offset, 1 in. lg, 5/8 in. dia, 7/8 in. projection inside; TOR No. 610-202-H	u/w B-1501

O-1503		FILTER, air: phos bronze maze mtd in channel frame 20 in. lg, 15 in. w, 3/4 in. thk; CBEN No. R-82-20-15-3/4	Mod bay
O-1505		DUCT, canvas: 8 oz. duck material; 13-7/8 in. lg, 4-5/8 in. ID by 3-9/16 ID at one end and 4-3/8 in. ID by 2-7/8 in. ID other end; CBIK No. 4174	Air duct in mod bay
O-1506		DUCT, plastic: black vinyl; 2 in. ID, 4-1/2 in. lg; MIM No. XTE-30	Air duct to mod tube
O-1507		Same as O-1506	Air duct to mod tube
O-1525		BEARING, ball, annular: single; two shields; bore 0.4724 in., OD 1.2598 in.; CBAM No. 6201-2RS	p/o B-1501
O-1701		IMPELLER: forward curve; steel; zinc finish; single width; 36 paddles; cw; 6-5/16 in. dia, 2-7/8 in. w; hub is single inside offset, 1 in. lg, 5/8 in. dia, 7/8 in. projection inside; TOR No. 610-228-H	Used with B-1701
O-1702		COUPLING, rigid; sleeve; 0.437 in. bore w/5/8 in. ID opening one end extending 3/32 in. 0.1876 in. hole 5/16 in. back from 0.437 in. ID end; 1-1/2 in. lg, 7/8 in. OD; stainless st. No. 303; CBIK No. 4167	Line shaft
O-1703		COUPLING, rigid: No. 303 stainless steel per AN-S-771 rod, 1 in. dia, 2-31/32 in. lg; bored one end 0.627 in. dia, 1 in. deep w/0.1885 in. by 0.390 keyway 2 in. lg; other end has force-fit plug turned down to 0.437 in. dia at end w/ 0.1870 in. pin hole and pressed pin installed; CBIK No. 4259	B-1702 to line shaft
O-1704		BEARING, ball, annular: single; two shields; bore 0.6693 in, OD 1.5748 in.; CBAM No. 6203-2RS	p/o B-1701
O-1705		Same as O-1503	RF bay
O-1707		DUCT, canvas: 8 oz. duck material; 14-3/4 in. lg, 3-3/4 in. ID by 3 in. ID one end and 4-3/8 in. ID by 3-9/16 in. ID other end; CBIK No. 4173	Air duct in RF bay
O-1708		DUCT, plastic: black vinyl; 2 in. ID, 6-3/4 in. lg; MIM No. XTE-30	Air duct to PA tube
O-1709		Same as O-1708	Air duct to PA tube
O-1728		Same as O-1704	p/o B-1702

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
P-101		CONNECTOR, plug: 12 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1-1/4 in. lg, 15/16 in. w, 1-5/8 in. h; 730 V rms, 10A; BM-120 Bakelite body; 9/16 in. dia max cable opening; no mtg prov; CJC No. S-312CCT	Power input to J-101
P-102		CONNECTOR, plug: 15 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1-11/16 in. lg, 1-1/8 in. w, 2-9/16 in. h; 730 V rms, 10A; BM-120 Bakelite body; 9/16 in. dia max cable opening; no mtg prov; CJC No. S-315CCT	Autotune info. to J-102
P-103		CONNECTOR, plug: 14 cont, male, rd, polarized, gnd'ed, straight; phone type, br; 1-7/8 in. lg, 15/32 in. w, 25/32 in. h; melamine body; w/hood; WIQ No. MRE-12-2PGH	Sub chassis connections
P-104		CONNECTOR, plug: 5 cont, male, rd, polarized, gnd'ed, straight; phone type; br; 25/32 in. lg, 25/32 in. dia; melamine body; w/hood WIQ No. M5P-H	Sub chassis connections
P-105		CONNECTOR, plug: 20 cont, female, rd, polarized, gnd'ed, straight; phone type, br, sil pl; 2 in. lg, 1-1/8 in. w, 2-3/16 in. h; COL No. 372-1042-00, (p/o O-111)	Input connections O-111
P-107		CONNECTOR, plug: AN/UG-88/U; 52-ohm impedance; CBSA	Output jack
P-108		Same as P-107	Sub chassis connections to J-108
P-109		CONNECTOR, plug: 4 cont, female; COL No. 502-6686-002	Z-101 connections
P-110		Same as P-109	Z-102 connections
P-301		CONNECTOR, plug: 24 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector: 2-5/8 in. lg, 1-1/8 in. w, 2-9/16 in. h; 730 V rms, 10A; BM-120 Bakelite body; 5/8 in. dia max cable opening; no mtg prov; CJC No. S-324CCT	Local remote input connections
P-302		CONNECTOR, plug: 8 cont, female, flat, polarized, gnd'ed straight; phone type, phos Bz connector; 1-1/4 in. lg, 11/16 in. w, 1-1/2 in. h; 730 V rms, 10A; BM-120 Bakelite body; 9/16 in. dia max cable opening; no mtg prov; CJC No. S-308CCT	Power input connections

P-303		CONNECTOR, plug: 6 cont, male, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1 in. lg, 11/16 in. w, 1-7/8 in. h; 730 V rms, 10A; BM-120 Bakelite body; 7/16 in. dia max cable opening; no mtg prov; CJC No. P-306CCT	Out connections to mod
P-305		Same as P-102	Power input connections
P-306		CONNECTOR, plug: 6 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 1 in. lg, 11/16 in. w, 1-15/32 in. h; 730 V rms, 10A; BM-120 Bakelite body; 7/16 in. dia max cable opening; no mtg prov; CJC No. S-306CCT	Signal input connections
P-601		Same as P-101	Channel information output
P-602		CONNECTOR, plug: 27 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 2-15/16 in. lg, 1-1/8 in. w, 2-9/16 in. h; 730 V rms, 10A; BM-120 Bakelite body; 5/8 in. dia max cable opening; no mtg prov; CJC No. S-327CCT	Power input
P-701		CONNECTOR, plug: 18 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 2 in. lg, 1-1/8 in. w, 2-9/16 in. h; 730 V rms, 10A; BM-120 Bakelite body; 9/16 in. dia cable opening; no mtg prov; CJC No. S-318CCT	Channel information input
P-702		Same as P-102	Channel information output
P-703 thru P-707		Same as P-107	R. F. output and input connectors
P-708		Same as P-101	Channel information output
P-709		CONNECTOR, plug: 12 cont, male, flat, polarized, gnd'ed, straight; phone type, phos Bz connector: 1-1/4 in. lg, 15/16 in. w, 2-1/32 in. h; 730 V rms, 10A; BM-120 Bakelite body; 9/16 in. dia max cable opening, no mtg prov; CJC No. P-312CCT	Channel information output
P-801		Same as P-102	Channel information input
P-802		Same as P-701	Power input
P-803		Same as P-107	R. F. input
P-804		Same as P-107	R. F. output
P-805		Same as P-103	Input and output of E-895

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
P-806		CONNECTOR, plug: 4 cont, female, flat, polarized, gnd'ed, straight; phone type, phos Bz connector; 3/4 in. lg, 11/16 in. w, 1-11/32 in. h; 730 V rms, 10A; BM-120 Bakelite; 3/8 in. dia max cable opening; no mtg prov; CJC No. S-304CCT	FSK and photo input
P-807		Same as P-105	O-809 channel info input
P-901		Same as P-302	Power input
P-902		Same as P-101	Channel info input
P-903		Same as P-107	Output
P-904		CONNECTOR, plug: 4 cont, male, rd, polarized, gnd'ed, straight; phone type, phos Bz connector; 25/32 in. lg, 11/16 in. dia; locking type; melamine body; mtg nut No. 3/8-24 thd; WIQ No. M4P-LSH	Oven power
P-1001		Same as P-306	Input connections to J-1001
P-1002		Same as P-709	Output connections from J-1002
P-1101		Same as P-101	Power connections to J-1101
P-1102		Same as P-301	Power and channel info connections to J-1102
P-1103		Same as P-107	R. F. signal connector to J-1103
P-1301		Same as P-102	Power input connections to J-1301
P-1302		Same as P-602	Channel info connections to J-1302

P-1303		CONNECTOR, plug: 2 cont, male, flat, polarized, gnd'ed straight; phone type, phos br ni pl; 2-3/8 in. lg, 1/2 in. dia; 8000 V dc, 2A cont; "I" shape, Rulon, no mtg prov; (p/o W-1910); CYA No. 8111M	J-1303
P-1401		Same as P-701	Power and channel info connections to J-1401
P-1501		CONNECTOR, plug: 2 cont, male, flat, polarized, gnd'ed straight; phone type, phos Bz connector; 1-23/32 in. lg, 21/32 in. dia; 730 V rms, 10A; BM-120 Bakelite body; 3/8 in. dia max cable opening; no mtg prov; CJC No. P-302CCT	Fil metering
R-102		RESISTOR, fixed: composition; JAN RC20BF222J; 2200 ohm, p/m 5%, 1/2 w; JAN-R-11; CBZ	V-101 cathode
R-103		RESISTOR, fixed: composition; JAN RC20BF473K; 47000 ohm, p/m 10%, 1/2 w; JAN-R-11; CBZ	V-101 plate decoupling
R-104		RESISTOR, fixed: composition; JAN RC20BF151K; 150 ohm, p/m 10%, 1/2 w; JAN-R-11; CBZ	V-101 grid
R-105		RESISTOR, fixed: composition; JAN RC20BF104K; 100,000 ohm, p/m 10%, 1/2 w; JAN-R-11; CBZ	V-101 grid
R-106		Same as R-103	V-101 plate
R-107		RESISTOR, fixed: composition; JAN RC20BF273K; 27,000 ohm, p/m 10%, 1/2 w; JAN-R-11; CBZ	V-102 plate decoupling
R-108		Same as R-107	V-102 plate decoupling
R-109		Same as R 103	V-102 plate to grid
R-110		RESISTOR, fixed: comp; JAN RC20BF103K; 10,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-102 grid
R-111		RESISTOR, fixed: comp; JAN RC20BF333K; 33,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-102 cathode
R-112		Same as R-111	V-102 grid
R-113		Same as R-110	V-102 grid
R-114		Same as R-103	V-102 plate to grid

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-115		Same as R-107	V-103 plate decoupling
R-116		Same as R-107	V-103 plate decoupling
R-117		Same as R-103	V-103 plate to grind
R-118		Same as R 110	V-103 grid
R-119		Same as R-111	V-103 cathode
R-120		Same as R-111	V-103 grid
R-121		Same as R-110	V-103 grid
R-122		Same as R-103	V-103 plate to grid
R-123		Same as R-103	V-104 grid
R-124		RESISTOR, fixed: comp; JAN RC20BF101K; 100 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-104 cathode
R-125		RESISTOR, fixed: comp; JAN RC20BF823K; 82,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-104 screen decoupling
R-126		RESISTOR, fixed: comp; JAN RC20BF683K; 68,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-105 grid
R-128		Same as R-126	V-105 screen dropping
R-129		RESISTOR, fixed: comp; JAN RC20BF393K; 39,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ; (part of Z-107)	V-105 plate decoupling

R-130		RESISTOR, fixed: comp; JAN RC30BF333K; 33,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-101 plate decoupling
R-134		Same as R-105	V-101 grid
R-136		RESISTOR, fixed: comp; JAN RC30BF333J; 33,000 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	V-129 plate
R-137		Same as R 129; (part of Z-106)	V-104 plate decoupling
R-138		RESISTOR, fixed: comp; JAN RC20BF474K; 470,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-108 grid #1
R-139		Same as R-105	V-108 grid #3
R-140		Same as R-104	V-108 cathode
R-142		RESISTOR, fixed: comp; JAN RC42BF123K; 12,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-108 plate decoupling
R-143		Same as R-104	V-109 cathode
R-145		RESISTOR, fixed: comp; JAN RC42BF153K; 15,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-109 plate decoupling
R-146		RESISTOR, fixed: comp; JAN RC20BF470K; 47 ohm; p/m 10%; 1/2 w; JAN-R-11; CBZ	V-110 grid #3
R-147		Same as R-104	V-110 cathode
R-149		Same as R 145	V-110 plate decoupling
R-150		Same as R-104	V-111 cathode
R-152		Same as R-145	V-111 plate decoupling
R-153		Same as R-126	V-127 grid #1
R-154		Same as R-146	V-111 grid
R-155		RESISTOR, fixed: comp; JAN RC20BF105K; 1.0 MEGOHM, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-112 grid #3

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-156		RESISTOR, fixed: comp; JAN RC20BF221K; 220 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-112 cathode
R-157		Same as R-129	V-112 screen dropping
R-158		RESISTOR, fixed: comp; JAN RC30BF562K; 5600 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-102 and V-103 plate decoupling
R-159		Same as R-138	V-113 grid
R-161		RESISTOR, fixed: comp; JAN RC20BF334K; 330,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-113 screen decoupling
R-162		RESISTOR, fixed: comp; JAN RC20BF223K; 22,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ; (part of Z-105)	V-113 plate decoupling
R-163		Same as R-105	V-114 grid
R-164		RESISTOR, fixed: comp; JAN RC40BF561K; 560 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-113 cathode
R-165		RESISTOR, variable: wire-wound; JAN RA25A2SD153 AK; 15,000 ohm, p/m 10%; 3 w; JAN-R-19; CTC	Output attenuator
R-166		RESISTOR, fixed: comp; JAN RC30BF682J; 6800 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	V-114 screen dropping
R-167		RESISTOR, fixed: comp; JAN RC40BF102K; 1000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	Z-102 B+ decoupling
R-168		RESISTOR, fixed: comp; JAN RC20BF102K; 1000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ; (part of Z-104)	V-112 plate decoupling
R-169		RESISTOR, fixed: comp; JAN RC20BF472K; 4700 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ; (part of Z-103)	Z-103 output loading
R-170		Same as R-103; (part of Z-103)	Z-103 input

R-171		Same as R-107	V-115 plate decoupling
R-172		Same as R-107	V-115 plate decoupling
R-173		Same as R-164	V-114 cathode
R-174		Same as R-110	V-115 grid
R-175		Same as R-125	V-115 cathode
R-176		Same as R-111	V-115 grid
R-177		Same as R-110	V-115 grid
R-179		RESISTOR, fixed: comp; JAN RC20BF183K; 18,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-116 plate load
R-180		Same as R-107	V-116 plate
R-181		Same as R-103	V-116 plate to grid
R-182		Same as R-110	V-116 grid
R-183		RESISTOR, fixed: comp; JAN RC20BF822K; 8200 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-116 plate load
R-184		Same as R-111	V-116 grid
R-185		Same as R-110	V-116 grid
R-186		Same as R-103	V-116 plate to grid
R-187		RESISTOR, fixed: comp; JAN RC30BF681K; 680 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	B+ decoupling interpolation circuit
R-188		Same as R-183	V-117 plate load
R-190		Same as R-103	V-116 plate to grid
R-191		Same as R-110	V-117 grid

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-192		Same as R-179	V-117 plate load
R-193		Same as R-111	V-117 grid
R-194		Same as R-110	V-117 grid
R-195		Same as R-103	V-117 plate to grid
R-196		RESISTOR, fixed: comp; JAN RC30BF273K; 27,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-118 plate
R-197		RESISTOR, fixed: comp; JAN RC20BF471K; 470 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-118 cathode
R-201		Same as R 138	V-123 plate
R-202		Same as R-138	V-123 plate
R-203		Same as R-138	V 124 plate
R-204		Same as R 138	V-124 plate
R-205		RESISTOR, fixed: comp; JAN RC20BF154K; 150,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-123 plate
R-206		Same as R-205	V-124 plate
R-207		RESISTOR, fixed: comp; JAN RC20BF122K; 1200 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V 123 cathode
R-208		Same as R-207	V-124 cathode
R-209		Same as R-138	V-123 grid
R-210		Same as R-138	V-123 grid
R-211		Same as R-138	V-124 grid

R-212		Same as R-105	V-123 grid
R-213		Same as R-105	V-125 load
R-214		Same as R-105	V-123 grid
R-215		Same as R-105	V-126 load
R-216		Same as R-105	V-124 grid
R-218		Same as R-105	V-125 load
R-219		Same as R-105	V-126 load
R-222		Same as R 156	V-127 cathode
R-223		Same as R-136	V-127 grid #3
R-224		RESISTOR, fixed: comp; JAN RC40BF223J; 22,000 ohm, p/m 5%; 2 w; JAN-R-11; CBZ	V-128 screen dropping
R-225		Same as R-155	V-128 grid
R-226		RESISTOR, fixed: comp; JAN RC20BF222K; 2200 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-127 plate decoupling
R-227		Same as R-156	V-128 cathode
R-229		Same as R-169	V-127 grid
R-230		Same as R-105	V-107 grid
R-231		Same as R-226	V-112 grid
R-232		Same as R-126	V-129 screen dropping
R-243		Same as R-146	V-109 grid coupling
R-244		Same as R-102	V-107 cathode
R-245		Same as R-125	V-116 cathode
R-246		Same as R-164	V-105 cathode

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-247		Same as R-196	V-107 plate
R-248		Same as R-103	V-117 plate to grid
R-249		RESISTOR, fixed: comp; JAN RC20BF563J; 56,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-117 cathode
R-250		Same as R-107	V-117 plate dropping
R-251		Same as R-103	V-115 plate to grid
R-252		Same as R-105	V-129 grid
R-253		Same as R-197	V-129 cathode
R-254		Same as R-138	V-124 grid
R-255		Same as R-105	V-124 grid
R-256		RESISTOR, fixed: wire-wound; JAN RW20G162; 1600 ohm, p/m 5%; 15 w; JAN-R-26; CHD	V-121 and V-122 cathode
R-257		Same as R-256	V-119 and V-120 cathode
R-258		RESISTOR, fixed: wire-wound; JAN RW20G102 000 ohm, p/m 5%; 15 w; JAN-R-26; CHD	B-102 DC brake current limiting
R-259		RESISTOR, fixed: comp; JAN RC30BF563K; 56,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-104 plate load
R-260		RESISTOR, fixed: comp; JAN RC30BF470K; 47 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-109 grid coupling
R-261		Same as R-207	V-108 screen
R-301		RESISTOR, fixed: comp; JAN RC40BF512K; 5100 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	Remote channel

R-302		Same as R-301	Indicator voltage divider
R-303		RESISTOR, fixed: comp; JAN RC40BF202K; 2000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-308 cathode
R-304		RESISTOR, fixed: comp; JAN RC40BF102K; 1000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V 301 cathode bias
R-305		RESISTOR, fixed: comp; JAN RC40BF473K; 47,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-308 grid
R-306		RESISTOR, fixed: comp; JAN RC40BF511K; 510 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-308 cathode return
R-307		RESISTOR, fixed: comp; JAN RC40BF103K; 10,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-308 plate dropping
R-308		Same as R-307	V-308 plate dropping
R-309		RESISTOR, fixed: comp; JAN RC40BF433K; 43,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	Limiter bridge arm
R-310		RESISTOR, fixed: comp; JAN RC40BF303K; 30,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	Limiter bridge arm
R-311		RESISTOR, fixed: comp; JAN RC40BF153K; 15,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	Limiter bridge arm
R-312		Same as R-305	V-301 plate
R-313		Same as R-305	V-301 plate
R-314		Same as R-311	Limiter bridge arm
R-315		Same as R-310	Limiter bridge arm
R-316		Same as R-309	Limiter bridge arm
R-317		RESISTOR, fixed: comp; JAN RC40BF104K; 100,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-308 grid

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-318		Same as R-304	V-304 cathode
R-319		Same as R-301	V-304 plate
R-320		RESISTOR, fixed: comp; JAN RC40BF475K; 4.7 MEGOHM, p/r 10%; 2 w; JAN-R-11; CBZ	V-305 cathode
R-321		Same as R-317	V-307 grid
R-322		Same as R-317	V-307 grid
R-323		RESISTOR, fixed: wire-wound; JAN RW22J312; 3100 ohm, p/m 5%; 21 w; JAN-R-26; CHD	B+ decoupling speech amplifier
R-324A/B		RESISTOR, variable: comp; two sect pot; 100,000 ohm each, p/m 20%; 1/2 w each; 3/8 in. lg bushing; 1/2 in. lg shaft; similar to JAN RV4ANSA104A; CTC	Input gain
R-325		RESISTOR, variable: comp; JAN RV4ATSD104A; pot; 100,000 ohm, p/m 20%; 2 w; JAN-R-94; CTC	MCW gain
R-326A/B		Same as R-324A/B	Limiter gain
R-328		RESISTOR, fixed: comp; JAN RC42BF392K; 3900 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-308 cathode
R-330		RESISTOR, fixed: comp; JAN RC30BF223K; 22,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	CR-301 bridge arm
R-331		Same as R-330	CR-301 bridge arm
R-332		RESISTOR, fixed: comp; JAN RC30BF563K; 56,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	CR-301 current limiting
R-333		RESISTOR, fixed: wire-wound; JAN RW22J252; 2500 ohm, p/m 5%; 21 w; JAN-R-26; CHD	B+ decoupling speech amplifier
R-334		RESISTOR, fixed: comp; JAN RC30B104K; 100,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-309/10 screen

R-335		Same as R-334	V-309/10 screen
R-336		Same as R-334	V-309/10 screen
R-337		Same as R-334	V-309/10 screen
R-338		RESISTOR, variable: wire-wound; JAN RA30A1SD500AK; 50 ohm, p/m 10%; 3 w; JAN-R-19; CTC	M-1503 calibrate
R-339		RESISTOR, variable: wire-wound; JAN RA20A1SD103AK; 10,000 ohm, p/m 10%; 2 w; JAN-R-19; CTC	M-1501 calibrate
R-340		RESISTOR, fixed: wire-wound; JAN RU4CR05K; 0.05 ohm, p/m 10%; 2 w; JAN-R-184; Resistance Products Co., Harrisburg, Penn. No. AGC	M-1503 shunt
R-341		RESISTOR, fixed: comp; JAN RC20BF332K; 3300 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-306 cathode
R-342		Same as R 341	V-307 cathode
R-343		Same as R-130	V-306 plate feedback
R-344		Same as R 130	V-307 plate feedback
R-345		RESISTOR, fixed: comp; JAN RC40BF184K; 180,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V. divider for keying voltage
R-346		Same as R-345	V. divider for keying voltage
R-347		Same as R-307	V. divider for keying voltage
R-348		RESISTOR, fixed: comp; JAN RC30BF470K; 47 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-308 grid return
R-349		Same as R-334	CR-301 current limiting
R-401		RESISTOR, variable: wire-wound; 50,000 ohm, p/m 20%; 4 w; CMC series No. 10 with 3/8 in. mtg bushing and 3/8 in. shaft for knob	Gain control
R-402		RESISTOR, variable: wire-wound; 50,000 ohm, p/m 20%; 4 w; w/ std bushing and sc dr slotted shaft; CMC series No. 10	M-402 calibrate

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-403		RESISTOR, variable: wire-wound; 20,000 ohm, p/m 10%; 4 w; CTC series No. 25-BA2212	+125 V adjust
R-404		RESISTOR, fixed: comp; JAN RC30BF224K; 220,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-401 plate
R-405		Same as R-130	V-401 plate decoupling
R-406		RESISTOR, fixed: comp; JAN RC30BF332K; 3300 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-401 cathode
R-407		RESISTOR, fixed: comp; JAN RC30BF334K; 330,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-401 cathode feedback
R-408		Same as R 332	M-402 multiplier
R-409		Same as R-404	M-402 grid
R-410		RESISTOR, fixed: comp; JAN RC40BF512K; 5100 ohm, p/m 10 %; 2w; JAN-R-11; CBZ	K-401 current limiting
R-411		RESISTOR, fixed: comp; JAN RC40BF111K; 110 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	Mic. supply voltage devider
R-413		Same as R-407	V-402 grid voltage devider
R-414		RESISTOR, fixed: comp; JAN RC30BF475K; 4.7 MEGOHM, p/m 10%; 1 w; JAN-R-11; CBZ	V-402 grid voltage devider
R-416		RESISTOR, fixed: comp; JAN RC30BF393K; 39,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-405 grid voltage devider
R-417		Same as R-130	V-405 screen devider

R-418		RESISTOR, fixed: comp; JAN RC30BF184K; 180,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-405 screen dropping
R-419		RESISTOR, fixed: comp; JAN RC30BF474K; 470,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-405 plate
R-420		RESISTOR, fixed: comp; JAN RC30BF823K; 82,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-405 grid
R-424		Same as R-404	Bleeder, power supply
R-425		RESISTOR, fixed: wire-wound; JAN RW21G502; 5000 ohm, p/m 5%; 22 w; JAN-R-26; CHD	V-407 current limiting
R-426		RESISTOR, fixed: wire-wound; JAN RW21G252; 2500 ohm, p/m 5%; 22 w; JAN-R-26; CHD	V-406 current limiting
R-427		RESISTOR, fixed: wire-wound; JAN RW22G103; 10,000 ohm, p/m 5%; 37 w; JAN-R-26; CHD	Mic. supply voltage devider
R-501		RESISTOR, fixed: comp; JAN RC30BF820K; 82 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-519 screen suppressor
R-502		Same as R-348	V-519 plate suppressor
R-503		RESISTOR, fixed: comp; JAN RC30BF471K; 470 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-519 grid suppressor
R-504		Same as R-348	V-520 plate suppressor
R-505		Same as R-501	V-520 screen suppressor
R-506		Same as R-503	V-520 grid suppressor
R-507		Same as R-348	V-521 plate suppressor
R-508		Same as R-501	V-521 screen suppressor

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-509		Same as R-503	V-521 grid suppressor
R-510		Same as R-348	V-522 plate suppressor
R-511		Same as R-501	V-522 screen suppressor
R-512		Same as R-503	V-522 grid suppressor
R-513		Same as R-348	V-523 plate suppressor
R-514		Same as R-501	V-523 screen suppressor
R-515		Same as R-503	V-523 grid suppressor
R-517		Same as R-416	V-524 screen bleeder
R-518		Same as R-334	V-524 screen voltage dropping
R-519		Same as R-404	V-524 plate load
R-520		RESISTOR, fixed: deposited film, carbon; 100,000 ohm, p/m 1%; 1 w; ETR No. DC-1	V-524 grid bleeder
R-521		Same as R-520	V-524 grid bleeder
R-522		Same as R-334	V-524 grid

R-523		RESISTOR, fixed: deposited film, carbon; 120,000 ohm, p/m, 1%; 1 w; ETR No. DC-1	V-524 grid bleeder
R-524		Same as R-520	V-524 grid bleeder
R-525		Same as R-520	V-524 grid bleeder
R-526		RESISTOR, fixed: wire-wound; JAN RW36G253; 25,000 ohm, p/m 5%; 60 w; JAN-R-26; CHD	V-525 current limiter
R-527		RESISTOR, fixed: wire-wound; JAN RW23G163; 16,000 ohm, p/m 5%; 47 w; JAN-R-26; CHD	V-529 current limiter
R-528		RESISTOR, variable: wire-wound; JAN RA25A1SA153AK; 15,000 ohm, p/m 10%; 4 w; JAN-R-19; CTC	-127 V bias adjust
R-529		Same as R-528	+1000 V power supply voltage adjust
R-530		RESISTOR, fixed: deposited film; carbon; 1.66 MEGOHM, p/m 1%; 2 w; RL1C No. CD-2-SR	M-1502 series
R-531		Same as R-530	M-1502 series
R-532		Same as R-530	M-1502 series
R-533		RESISTOR, fixed: wire-wound; JAN RW10G503; 50,000 ohm, p/m 5%; 140 w; JAN-R-26; CHD	+4200 V bleeder
R-534		Same as R-533	+4200 V bleeder
R-536		RESISTOR, fixed: wire-wound; JAN RW12G253; 25,000 ohm, p/m 5%; 80 w; JAN-R-26; CHD	+460 V bleeder
R-537		Same as R-168	+20V microphone supply
R-538		RESISTOR, fixed: wire-wound; JAN RW10G102; 1000 ohm, p/m 5%; 140 w; JAN-R-26; CHD	-400 V bleeder

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-539		Same as R-538	-400 V bleeder
R-540		RESISTOR, fixed: wire-wound; JAN RP251SA101JJ; 100 ohm, p/m 5%; 100 w; JAN-R-22; CHD	-124 V bias adjust
R-541		Same as R-540	-60 V bias adjust
R-542		Same as R-540	-24 V bias adjust
R-546		RESISTOR, fixed: wire-wound; JAN RW10G111; 110 ohm, p/m 5%; 140 w; JAN-R-26; CHD	V-1301, V-1302 plate dropping
R-547		Same as R-546	V-1301, V-1302 plate dropping
R-548		Same as R-546	V 1301, V-1302 plate voltage dropping
R-549		Same as R-546	V-1301, V-1302 plate voltage dropping
R_550		Same as R 546	V-1301, V-1302 plate voltage dropping
R-551		Same as R-546	V-1301, V- 1302 plate voltage dropping
R-552		RESISTOR, fixed: wire-wound; JAN RW11G251; 250 ohm, p/m 5%; 116 w; JAN-R-26; CHD	V-1301, V- 1302 screen voltage dropping
R-553		Same as R-501	V-518 screen suppressor

R-554		Same as R-548	V-518 plate suppressor
R-555		Same as R-503	V-518 grid suppressor
R-556		RESISTOR, variable: wire-wound; JAN RA20A1SA250AJ; 25 ohm, p/m 5%; 2 w; JAN-R-19; CTC	K-510 overload adjust
R-557		RESISTOR, fixed: wire-wound: JAN RW20G1RO; 1 ohm, p/m 0.05 ohm; 15 w; JAN-R-26; CHD	K-510 voltage input
R-558		RESISTOR, fixed: wire-wound; JAN RW38G201; 200 ohm, p/m 5%; 110 w; JAN-R-26; CHD	T-507 output voltage dropping
R-559		RESISTOR, fixed: comp; JAN RC40BF471K; 470-ohm, p/m 10%; 2 w; JAN-R-11; CBZ	K-509 spark suppressor
R-560		Same as R-559	K-509 spark suppressor
R-601		Same as R-503	K-612 spark suppressor
R-701		RESISTOR, fixed: comp; 4.7 ohm, p/m 10%; 1 w; CBZ type GB	S-711 spark suppressor
R-702		Same as R-701	S-712 spark suppressor
R-801		RESISTOR, fixed: comp; JAN RC20BF560K; 56 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	Input termination
R-802		RESISTOR, fixed: comp; JAN RC20BF274K;270,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-812 grid
R-803		RESISTOR, fixed: comp; JAN RC20BF201K; 200 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-812 cathode
R-804		RESISTOR, variable: wire-wound; JAN RA20A1SD501AK; 500 ohm, p/m 10%; 2 w; JAN-R-19; CTC	Input attenuator
R-805		Same as R-169	Z-803 input
R-806		RESISTOR, fixed: comp; JAN RC20BF474J; 470,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	Photo balance bleeder

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-807		RESISTOR, fixed: deposited film, carbon; 1.6 MEGOHM, p/m 1%; 1/2 w; ETR No. DC-1/2	V-808 screen
R-808		RESISTOR, fixed: deposited film, carbon; 400,000 ohm, p/m 1%; 1/2 w; ETR No. DC-1/2	V-808 plate
R-809		RESISTOR, fixed: comp; JAN RC20BF104J; 100,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-808 grid
R-810		RESISTOR, fixed: comp; JAN RC20BF221J; 220 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-808 cathode bias
R-811		RESISTOR, fixed: comp; JAN RC20BF122J; 1200 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-808 cathode bias
R-812		RESISTOR, fixed: deposited film, carbon; 47,000 ohm, p/m 1%; 1/2 w; type RN 15 per MIL-R-10509A; RL1C No. CD-1/2 PR	L-816 loading V-808 grid
R-813		RESISTOR, fixed: comp; JAN RC30BF683K; 68,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-801 grid
R-814		RESISTOR, fixed: comp; JAN RC30BF560K; 56 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-801, V-802 cathode bias
R-815		RESISTOR, fixed: comp; JAN RC30BF151K; 150 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-801, V-802 cathode bias
R-816		Same as R-339	V-801, V-802 balance adjust
R-817		RESISTOR, fixed: comp; JAN RC40BF273K; 27,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-801, V-802 screen V dropping
R-818		Same as R-817	V-801, V-802 screen V dropping
R-819		RESISTOR, fixed: comp; JAN RC40BF223K; 22,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ; (part of T-801)	V-801, V-802 plate V dropping

R-820		Same as R-814; (part of T-802)	L-804, C-807 suppressor
R-821		RESISTOR, fixed: comp; JAN RC30BF153K; 15,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ; (part of T-802)	V-803 grid bias
R-822		RESISTOR, fixed: comp; JAN RC30BF680K; 68 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-803 cathode bias
R-823		RESISTOR, fixed: comp; JAN RC30BF122J; 1200 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	V-803 grid bias bleeder
R-824		RESISTOR, fixed: comp; JAN RC30BF153J; 15,000 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	V-803 grid bias bleeder
R-825		Same as R-130	V-803 screen V dropping
R-826		RESISTOR, fixed: comp; JAN RC30BF223J; 22,000 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	V-804 grid bias bleeder
R-827		RESISTOR, fixed: comp; JAN RC20BF822J; 8200 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-804 grid bias bleeder
R-828		Same as R-348	V-804 grid suppressor
R-829		Same as R-183	V-812 plate load
R-830		RESISTOR, variable: wire-wound; 25,000 ohm, p/m 20%; 4 w; shaft 1-1/2 in. lg, slotted; CMC series No. 10	V-804 output attenuator
R-831		RESISTOR, fixed: comp; JAN RC40BF272K; 2700 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-804 screen V dropping
R-832		RESISTOR, fixed: deposited film, carbon: 6.66 ohm, p/m 1%; 1 w; ETR No. DC-1	M-801 shunt
R-833		RESISTOR, fixed: comp; JAN RC20BF202J; 2000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-809, V-810 grid shunt
R-834		RESISTOR, fixed: deposited film, carbon; 2000 ohm, p/m 1%; 2 w; ETR No. DC-1/2	V-809, V-810 grid shunt
R-835		RESISTOR, fixed: wire-wound; JAN RW30G631; 630 ohm, p/m 5%; 7 w; JAN-R-26; CHD	Photo input

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-836		RESISTOR, fixed: comp; JAN RC20BF472J; 4700 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-809, V-810 grid shunt
R-837		Same as R-811	V-809, V-810 grid shunt
R-838		RESISTOR, fixed: deposited film, carbon; 68,000 ohm, p/m 1%; 1/2 w; type RN 15 per MIL-R-10509A; RLIC No. CD-1/2 PR	V-809, V-810 screen V dropping
R-839		Same as R-804	Space adjust
R-840		RESISTOR, fixed: deposited film, carbon; 82,000 ohm, p/m 1%; 1/2 w; type RN 15 per MIL-R-10509A; RLIC No. CD-1/2 PR	V-809 grid
R-841		Same as R-840	V-810 grid
R-842		Same as R-810	V-808, V-809, V-810 B+ decoupling
R-843		RESISTOR, fixed: comp; JAN RC20BF103J; 10,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-809 grid filter
R-844		Same as R-843	V-810 grid filter
R-845		RESISTOR, fixed: comp; JAN RC20BF123J; 12,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-809, V-810 cathode current stabilizer
R-846		Same as R-339	Photo calibrate
R-847		RESISTOR, fixed: comp; JAN RC20BF223J; 22,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-809 cathode bias
R-848		Same as R-847	V-810 cathode bias

R-849		RESISTOR, fixed: deposited film, carbon; 27,000 ohm, p/m 1%; 1/2 w; type RN 15 per MIL-R-10509A; RLIC No. CD-1/2 PR	V-808 multiply-by bleeder
R-850		RESISTOR, variable: wire-wound; 3000 ohm, p/m 10%; 2 w; bushing 3/8 in. lg; shaft 1/2 in. lg, slotted; CMC series No. 43 W	Photo balance control
R-851		Same as R-849	V-808 multiply-by bleeder
R-852		RESISTOR, fixed: comp; JAN RC20BF473J; 47,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-808 multiply-by bleeder
R-853		Same as R-847	V-808 multiply-by bleeder
R-854		RESISTOR, variable: wire-wound; 600 ohm, p/m 5%; 1-1/2 w; bushing 1/4 in. lg; shaft 5/16 in. lg from mtg sur, slotted; CMC series No. 49W	X-2 shift adjust
R-855		Same as R-854	X-4 shift adjust
R-856		Same as R-854	X-8 shift adjust
R-857		RESISTOR, variable: wire-wound; 750 ohm, p/m 5%; 2 w; bushing 3/8 in. lg; shaft 1/2 in. lg, slotted; CMC series No. 43 W	AC balance adjust
R-858		Same as R-339	Mark adjust
R-859		RESISTOR, fixed: comp; JAN RC20BF393J; 39,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-805 cathode
R-860		Same as R-806	V-806 grid
R-861		RESISTOR, fixed: comp; JAN RC20BF124J; 120,000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-805 bleeder
R-862		RESISTOR, fixed: comp; JAN RC20BF502J; 5000 ohm, p/m 5%; 1/2 w; JAN-R-11; CBZ	Z-803 load
R-863		RESISTOR, fixed: comp; JAN RC30BF100J; 10 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	S-808 suppressor
R-863A		Same as R-863	S-808 suppressor
R-864		RESISTOR, fixed: comp; JAN RC30BF103K; 10,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-807 plate decoupling
R-865		RESISTOR, fixed; comp; JAN RC30BF124K; 120,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ; (part of Z-804)	V-807 phase shift

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-866		Same as R-865; (part of Z-804)	V-807 phase shift
R-867		RESISTOR, fixed: comp; JAN RC20BF104K; 100,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ; (part of Z-804)	V-807 grid
R-868		RESISTOR, variable: comp; JAN RV2ATSA104A; 100,000 ohm, p/m 10%; 1/4 w; Jan -R-94; CTC; (part of Z - 804)	V-807 frequency adjust
R-869		RESISTOR, variable: wire-wound; JAN RA20A1SD502AK; 5000 ohm, p/m 10%; 2 w; JAN-R-19; CTC; (part of Z-804)	V-807 degeneration control
R-870		Same as R-419	V-806 grid input
R-871		RESISTOR, fixed: comp; JAN RC30BF154J; 150,000 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	V-807 screen V dropping
R-872		RESISTOR, fixed: comp; JAN RC30BF472K; 4700 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-807 plate load
R-873		Same as R-334	V-807 plate load
R-874		RESISTOR, fixed: comp; JAN RC30BF155K; 1.5 MEGOHM, p/m 10%; 1 w; JAN-R-11; CBZ	V-806 grid bleeder
R-875		RESISTOR, fixed: comp; JAN RC30BF154K; 150,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-806 grid
R-876		RESISTOR, fixed: comp; JAN RC30BF101K; 100 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-811 grid
R-877		Same as R-196	V-811 grid
R-878		Same as R-330	V-811 plate load
R-879		RESISTOR, fixed: comp; JAN RC30BF222K; 4700 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-811 plate load

R-880		Same as R-330	V-811 plate load
R-881		Same as R-332	V-801 injection grid
R-882		Same as R-332	V-802 injection grid
R-883		Same as R-864	V-811 plate decoupling
R-884		Same as R-875	V-806 grid
R-885		RESISTOR, variable: wire-wound; JAN RA20B1SD501AK; 500 ohm, p/m 10%; 2 w; w/ SPST sw; JAN-R-19; CTC	V-807 phase modulation adjust
R-886		RESISTOR, fixed: comp; JAN RC30BF473K; 47K, p/m 10%, 1 w; JAN-R-11; CBZ	V-806 plate load
R-887		RESISTOR, fixed: comp; JAN RC20BF105J; 1.0 MEGOHM, p/m 5%; 1/2 w; JAN-R-11; CBZ	V-806 grid coupling
R-888		Same as R-407	V-806 grid coupling
R-889		Same as R-330	V-806 plate load
R-890		RESISTOR, variable: wire-wound; JAN RA20A1FD103AK; 10,000 ohm, p/m 10%; 2 w; JAN-R-19; CTC	Z-803 termination
R-891		RESISTOR, fixed: comp; JAN RC20BF102J; 1000 ohm; p/m 5%; 1/2 w; JAN-R-11; CBZ	M-801 meter shunt
R-892		RESISTOR, fixed: comp; JAN RC20BF823K; 8200 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	T-803 primary loading
R-893		Same as R-806	V-806 grid bias
R-894		Same as R-125; (part of XI-802)	I-802 current limiter
R-895		Same as R-103; (part of XI-801)	I-801 current limiter
R-896		Same as R-847	V-809, V-810 current limiter, S-805 in calibrate position
R-897		Same as R-872	V-807 phase modulation load

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-898		RESISTOR, fixed: comp; JAN RC30BF122K; 1200 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-812 plate decoupling
R-899		Same as R-339	V-809, V-810 DC balance adjust
R-902		RESISTOR, fixed: deposited film, carbon; 900 ohm, p/m 1%; 1/2 w; ETR No. DC-1/2	M-901 multiplier
R-903		Same as R-103	V-901 grid
R-904		Same as R-124	V-901 cathode
R-905		RESISTOR, fixed: deposited film, carbon; 71.4 ohm, p/m 1%; 1/2 w; ETR No. DC-1/2	M-901 multiplier
R-906		Same as R-872	V-901 plate
R-907		Same as R-130	V-901 screen
R-908		Same as R-155	V-902 grid
R-909		Same as R-815	V-902 cathode
R-910		RESISTOR, fixed: deposited film, carbon; 6.71 ohm, p/m 1%; 1/2 w; ETR No. DC-1/2	M-901 multiplier
R-911		Same as R-701	S-902 spark suppressor
R-912		Same as R-701	K-901 spark suppressor
R-914		RESISTOR, fixed: comp; JAN RC20BF332K; 3300 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-902 grid
R-915		RESISTOR, fixed: wire-wound; JAN RW22J632; 6300 ohm, p/m 5%; 29 w; JAN-R-26; CHD	+ 500 V dropping

R-1001		Same as R-426	-105 V filter
R-1002		Same as R-1001	105 V filter
R-1003		Same as R-1001	105 V filter
R-1007		RESISTOR, fixed: comp; JAN RC30BF100K; 10 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-1005 plate suppressor
R-1008		Same as R-1007	V-1006 plate suppressor
R-1009		Same as R-1007	V-1007 plate suppressor
R-1010		Same as R-197	V-1005 grid suppressor
R-1011		Same as R-197	V-1006 grid suppressor
R-1012		Same as R-197	V-1007 grid suppressor
R-1013		RESISTOR, fixed: comp; JAN RC40BF104K; 100,000 ohms, p/m 10%; 2w; JAN-R-11; CBZ	V-1008 screen
R-1014		**Same as R-130**	V-1008 screen
R-1015		Same as R-138	V-1008 screen
R-1016		RESISTOR, fixed: deposited film, carbon; 120,000 ohm, p/m 1%; 1 w; ETR No. DC-1	Voltage divider
R-1017		Same as R-528	Adj. +240 V
R-1018		RESISTOR, fixed: deposited film, carbon; 47,000 ohm, p/m 1%; 1 w; ETR No. DC-1	Voltage divider
R-1019		Same as R-197	V-1009 grid suppressor
R-1020		Same as R-138	V-1010 plate
R-1021		Same as R-1013	V-1010 screen
R-1022		Same as R-130	V-1010 screen

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-1023		RESISTOR, fixed: deposited film, carbon; 82,000 ohm, p/m 1%; 1 w; ETR No. DC-1	Voltage divider
R-1024		Same as R-528	Adj. +160
R-1025		Same as R-1018	Voltage divider
R-1026		RESISTOR, fixed: wire-wound; JAN RW55G5RO; 5 ohm, p/m 5%; 5 w; JAN-R-26; COM	6.3 V AC regulator bleeder
R-1027		RESISTOR, variable: wire-wound; JAN RA25A1SA250AK; 25 ohm, p/m 10%; 2 w; JAN-R-19; CTC	Adj. 6.3 V AC regulator
R-1028		RESISTOR, current regulating: ac oper; 10.8 V threshold; 0.29 to 0.32 amp vari; type T-6-1/2 envelope per MIL-E-1B; octal base, element connected to pins 2, 7; CAGK No. 3-7	6.3 V AC regulator
R-1029		Same as R-1028	6.3 V AC regulator
R-1030		Same as R-1028	6.3 V AC regulator
R-1031		Same as R-1028	6.3 V AC regulator
R-1101		RESISTOR, fixed: comp; JAN RC30BF510J; 51 ohm, p/m 5%; 1 w; JAN-R-11; CBZ	V-1101 grid input
R-1102		Same as R-864	V-1101 grid
R-1103		Same as R-110	V-1101 screen dropping
R-1104		Same as R-420	V-1101 screen dropping
R-1105		Same as R-898	V-1101 screen decoupling

R-1106		RESISTOR, fixed: comp; JAN RC40BF470K; 47 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-1102 grid suppressor
R-1107		RESISTOR, fixed: comp; JAN RC30BF223K; 22,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-1102 grid
R-1108		RESISTOR, fixed: comp; JAN RC40BF911K; 910 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-1102 cathode
R-1109		RESISTOR, fixed: comp; JAN RC30BF473K; 47,000 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	V-1102 screen dropping
R-1110		Same as R-1107	V-1102 screen dropping
R-1111		RESISTOR, fixed: wire-wound; JAN RB51B11R11F; 11.11 ohm, p/m 1%; 1/4 w; JAN-R-93; RESP	M-1101 position #2 shunt
R-1112		Same as R-898	V-1102 screen decoupling
R-1113		RESISTOR, fixed: comp; JAN RC40BF271K; 270 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-1103 screen decoupling
R-1114		Same as R 402	Drive adj. band #1
R-1115		Same as R-402	Drive adj. band #2
R-1116		Same as R-402	Drive adj. band #3
R-1117		Same as R-402	Drive adj. band #4
R-1118		Same as R-1111	M-1101 position #3 shunt
R-1119		Same as R-821	V-1103 grid decoupling
R-1120		Same as R 1106	V-1103 grid suppressor

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R 1121		RESISTOR, fixed: comp; JAN RC40BF301J; 300 ohm, p/m 5%; 2 w; JAN-R-11; CBZ	V-1103 cathode
R-1122		Same as R-503	V-1103 screen suppressor
R-1123		Same as R-1107	V-1103 plate load
R-1124		Same as R-1107	V-1103 plate load
R-1125		Same as R-1107	V-1103 plate load
R-1126		RESISTOR, fixed: wire-wound; JAN RB51B1R110F; 1.11 ohm, p/m 1%; 1/4 w; JAN-R-93; RESP	M-1101 position #4 shunt
R-1127		RESISTOR, fixed: wire wound; JAN RB51B3R330F; 3.33-ohm, p/m 1%; 1/4 w; JAN-R-93; RESP	M-1101 position #5 shunt
R-1128		Same as R-303	V-1104/5 grid decoupling
R-1129		RESISTOR, fixed: comp; JAN RC40BF101K; 100 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-1104/5 grid
R-1130		Same as R-1106	V-1105 grid suppressor
R-1131		Same as R-1106	V-1104 grid suppressor
R-1132		Same as R-1007	V-1104/5 cathode return
R-1133		Same as R-1007	V-1104/5 cathode return
R-1134		Same as R-1007	V-1104/5 cathode return

R-1135		Same as R-1007	V-1104/5 cathode return
R-1136		RESISTOR, fixed: comp; JAN RC40BF151K; 150 ohm, p/m 10%, 2 w; JAN-R-11; CBZ	V-1104/5 screen decoupling
R-1139		RESISTOR, fixed: wire-wound; JAN RW21G801; 800 ohm, p/m 5%; 22 w; JAN-R-26; CHD	V-1106 plate dropping
R-1140		Same as R-345	V-1107 screen divider
R-1141		Same as R-130	V-1107 screen divider
R-1142		Same as R-503	V-1106 grid suppressor
R-1143		Same as R-503	V-1106 grid suppressor
R-1144		Same as R-419	V-1107 plate
R-1145		RESISTOR, fixed: deposited film, carbon; 120,000 ohm, p/m 1%; 1 w; ETR No. DC-1	V-1107 grid divider
R-1146		Same as R-528	+ 220 V DC Adj.
R-1147		RESISTOR, fixed: deposited film, carbon; 47,000 ohm, p/m 1%; 1 w; ETR No. DC-1	V-1107 grid divider
R-1148		RESISTOR, fixed: deposited film, carbon; 12,000 ohm, p/m 1%; 1 w; ETR No. DC-1	M-402 multiplier
R-1149		RESISTOR, fixed: deposited film, carbon; 1,000 ohm, p/m 1%; 1 w; ETR No. DC-1	M-402 multiplier
R-1150		Same as R-1149	M-402 multiplier
R-1151		Same as R-1149	M-402 multiplier
R-1152		Same as R-1149	M-402 multiplier
R-1153		Same as R-1149	M-402 multiplier

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-1154		Same as R-1149	M-402 multiplier
R-1155		Same as R-1149	M-402 multiplier
R-1156		Same as R-1149	M-402 multiplier
R-1157		Same as R-1149	M-402 multiplier
R-1158		Same as R-1149	M-402 multiplier
R-1159		Same as R-1007	S-1101 spark suppressor
R-1160		Same as R-1007	S-1101 spark suppressor
R-1161		Same as R-402	Drive adj. band #5
R-1162		Same as R-1121	V-1102 plate
R-1163		Same as R-503	V-1103 grid
R-1164		Same as R-1129	V 1104/5 grid
R-1165		Same as R-1136	V-1104/5 screen decoupling
R-1166		RESISTOR, fixed: comp; 10 ohm, p/m 10%; 13 w; metalized ends; 3 in. lg, 1/2 in. dia; CCO No. CX	V-1104 plate suppressor
R-1167		Same as R-1166	V-1105 plate suppressor
R-1182		RESISTOR, fixed: comp; JAN RC30BF272K; 2700 ohm, p/m 10%, 1 w; JAN-R-11; CBZ	V-1102 plate
R-1183		Same as R-1106	V-1103 plate suppressor

R-1201		RESISTOR, fixed: JAN RC20BF124K; 120,000 ohm, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-1201 grid
R-1202		Same as R-1201	V-1201 grid
R-1203		Same as R-111	V-1201 grid
R-1204		Same as R-1201	V-1201 grid
R-1205		Same as R-1201	V-1201 grid
R-1206		Same as R-158	V-1201 cathode
R-1207		Same as R-345	V-1201 cathode
R-1208		RESISTOR, fixed: comp; JAN RC40BF224K; 220,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-1201 plate
R-1209		Same as R-332	V-1201 grid to plate
R-1210		RESISTOR, fixed: comp; JAN RC40BF274K; 270,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-1201 grid voltage dropping
R-1211		RESISTOR, fixed: comp; JAN RC20BF125K; 1.2 MEGOHM, p/m 10%; 1/2 w; JAN-R-11; CBZ	V-1201 cathode
R-1212		Same as R-1208	V-1201 plate
R-1213		RESISTOR, fixed: comp; JAN RC40BF154K; 150,000 ohm, p/m 10%; 2 w; JAN-R-11; CBZ	V-1202 grid coupling
R-1214		Same as R-1210	V-1202 grid voltage dropping
R-1215		RESISTOR, fixed: comp; JAN RC20BF564K; 560,000 ohm p/m 10%; 1/2 w; JAN-R-11; CBZ	V-1202 grid
R-1216		RESISTOR, fixed: comp; JAN RC30BF123K; 12,000 ohm, p/m 10% 1 w; JAN-R-11; CBZ	V-1202 plate
R-1217		Same as R-404	V-1202 plate
R-1218		Same as R-1215	V-1203 grid

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R-1219		RESISTOR, fixed: comp; JAN RC30BF105K; 1.0 MEGOHM, p/m 10%; 1 w; JAN-R-11; CBZ	V-1203 grid voltage dropping
R-1220		Same as R-819	V-1203 plate
R-1221		Same as R-1220	V-1203 plate
R-1222		Same as R-831	V-1204 current limiting
R-1223		Same as R-831	V-1204 current limiting
R-1224		Same as R-831	V-1204 current limiting
R-1225		Same as R-831	V-1204 current limiting
R-1226		Same as R-303	V-1204 current limiting
R-1227		Same as R-303	V-1204 current limiting
R-1301		RESISTOR, fixed: ceramic; 50 ohm, p/m 10%; 3 in. lg, 5/8 in. dia; plain metallized ends; CCO type CX	V-1302 grid suppressor
R-1302		Same as R-1301	V-1301 grid suppressor
R-1303		RESISTOR, fixed: deposited film, carbon; 6000 ohm, p/m 1%; 1 w; ETR No. DC-1	M-1701 multiplier
R-1304		RESISTOR, variable: wire-wound; JAN RA20A1SA102AK; 1000 ohm, p/m 10%; 2 w; JAN-R-19; CTC	M-1701 calibrate

R-1305 thru R-1315		Same as R-348 But assemble per CBIK 4346	V-1301/2 cathode return
R-1316		RESISTOR, fixed: wire-wound; JAN RW35G160; 16 ohm, p/m 5%; 38 w; JAN-R-26; CHD	V-1301/2 plate decoupling
R-1317 thru R-1321		Same as R-348 But assemble per CBIK 4346	V-1301/2 cathode return
R-1323		RESISTOR, fixed: 50 ohm, p/m 10%; 25 w; 5 in. lg, 1 in. dia; metallized ends; CCO No. CX	V-1302 plate suppressor
R-1324		Same as R-1323	V-1301 plate suppressor
R-1386		RESISTOR, fixed: comp; JAN RC30BF560K; 56 ohm, p/m 10%; 1 w; JAN-R-11; CBZ	CR-1301 current limiting
R-1401		Same as R-1386	CR-1401 current limiting
R-1402		Same as R-1386	CR-1402 current limiting
R-1601		RESISTOR, fixed: wire wound; 115 V AC; 1000 w; 1-1/2 in. w, 25-1/2 in. lg, 3/8 in. thk; CVV No. SE2501	Current limiting T-1603
R-1602		Same as R-1601	Current limiting T-1603
R-1603		Same as R-1601	Current limiting T-1603
S-101		SWITCH, toggle: JAN ST42A; SPST; 2 pos, OFF-ON; 250 V ac, 6A resistive load, 15A (at 30 V dc) inductive load; 1-1/16 in. lg, 41/81 in. w, 1-9/64 in. h, bushing 15/32 in. lg; bat. handle 11/16 in. lg from bushing; per JAN-S-23; CAE No. 8803K6	Plate on-off
S-102		SWITCH, toggle: JAN ST52N; DPDT; 2 pos, OFF-ON; 250 V ac, 9A resistance load, 15A (at 30 V dc) inductive load; 1-1/16 in. lg, 49/64 in. w, 1-21/64 in. h, bushing 15/32 in. lg; bat. handle, 11/16 in. lg from bushing; per JAN-S-23; CAE No. 8825K5	Set up operate

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
S-104		SWITCH, sensitive: SPDT; 250 V ac, 5A; 3/4 in. lg, 7/16 in. w, 1/4 in. thk; actuator, plunger 7/32 in. from mtg hole, 1/32 in. tot travel, 1/64 in. pre-travel, 1/64 in. over-travel, 3 oz operating force; momentary; non-locking; CMU No. ISMI WINT	B-102 centering
S-301		SWITCH, lever, pile-up: 2 pos, 1A lock, 1A non-lock per Ref Dwg Gr 4; 115 V ac, 10A; 3-3/8 in. lg, 15/16 in. w, 1-1/4 in. d; bat. handle, 1 in. lg, 1/4 in. dia; CAU No. D321308A	Carrier test key
S-302		SWITCH, DIAL, telephone: metal number plate black on white, Nos. 1 to 10 and letter A; finger wheel br, black, dull, 11 holes; 1-1/2 in. lg, 3 in. dia; impulse spring N. O.; CAU No. AK-23 w/panel mtg base	Channel selector local dial
S-303		SWITCH, lever, pile-up: one way, 2 positions, 1 lock, 1 normal lock; 2B4C1A per Ref Dwg Gr 4; 115 V ac, 10A; 3-3/8 in. lg, 15/16 in. w, 1-1/4 in. d, bat. handle, 1 in. lg, 1/4 in. dia; CAU No. PK-180-A3E	Local remote
S-401		Same as S-101	On-off switch
S-402		SWITCH, toggle: JAN ST12D; SPDT, 2 pos, ON-OFF; 250 V ac, 2A resistive load, 1. 5A inductive load; 31/32 in. lg, 23/32 in. w, 1-9/32 in. h, bushing 15/32 in. lg; bat. handle, 11/16 in. lg from bushing; per JAN-S-23; CAE No. 8816K5	Key voltage selector
S-403		KEY, telegraph: manual, vert, hor, tension adj; 5-7/16 in. lg, 2 in. w, 1-9/16 in. h; 2 cont, 0. 225 in. dia, coin sil; zinc die cast base, 3-3/8 in. lg, 2 in. w, 1/2 in. h excluding pivot supports; mtg, 1-7/32 in. c/c 0. 180 in. dia mtg holes, CEJ No. 114-320	Telegraph key
S-404		Same as S-302 except maint item for HS-401	Telephone dial
S-501		SWITCH, rotary: 1 sect, 3 pos, 1 cont 115 V ac, 1A, non-shorting; 9/16 in. lg, 1-7/8 in. W; "D" shaft 11/16 in. lg, 7/32 in. dia; COC No. 58950-H1	Calibrate , tune operate PP-1198

S-502		SWITCH, toggle: JAN ST52K; DPST; 2 pos, OFF-ON; 250 V ac, 9A resistive load, 15A (at 30 V dc) inductive load; 1-1/16 in. lg, 49/64 in. w, 1-21/64 in. h, bushing 15/32 in. lg; bat. handle, 11/16 in. lg from bushing; per JAN-S-23; CAE No. 8823K5	Battle short
S-503		SWITCH, push: 1A1B per Ref Dwg Gr 4; 220 V ac, 5A; push button; momentary START is N. O., STOP is N. C.; non-locking; 3-5/8 in. lg, 1-1/2 in. w, 1-1/2 in. h, mtg holes 3/16 in. dia 3-1/4 in. c/c; CBZ No. 2SA, X-61740 w/o enclosure	Plate on PP-1198
S-504		Same as S-503	Fil. on PP-1198
S-505		SWITCH, toggle: JAN ST12C; SPST; 2 pos, momentary ON; 250 V ac, 2A resistive load, 1.5A inductive load; 31/32 in. lg, 23/32 in. w, 1-9/32 in. h, bushing 15/32 in. lg; bat. handle 11/16 in. lg from bushing; per JAN-S-23; CAE No. 8817K5	K-510 overload reset
S-701 thru S-710		SWITCH, rotary: 1 sect, 4 pos, 1 cont; 115 V ac, 1A, shorting; 5/8 in. lg, 1-5/16 in. w; "D" shaft, 9/16 in. lg, 7/32 in. dia; COC No. 58945-F1	Excitation control channel switches
S 711		SWITCH, rotary, solenoid: rot sw solenoid actuated; sw 3 sect, 4 pos, 12 cont each sect, non-shorting, sil cont, 1A, used to switch RF; solenoid, rot type, sing. coil, 48 V dc, 19-ohms, stroke has 30 deg movement, CCW, 6 lb pull; sw and solenoid 7-1/4 in. lg, 1-7/8 in. dia max, 2-53/64 in. c/c foot mtg; COC No. RS-51102	Excitation selector
S-712		SWITCH, rotary, solenoid: rot sw solenoid actuated; sw 4 sect, 10 pos, 12 cont each sect, non-shorting, sil cont, 1A; solenoid, rot type, sing. coil, 48 V dc, 19-ohms, stroke has 30 deg movement, CCW, 6 lb pull; sw and solenoid 6-7/8 in. lg, 1-7/8 in. dia max, 2-45/64 in. c/c foot mtg; COC No. RS-51097	Channel repeater
S-801		Same as S-502	Plate on
S-802		Same as S-102	M-801 meter switch
S-803		SWITCH, rotary: 2 sect, 5 pos, 2 cont each sect; 115 V ac, 1A, shorting; 3/4 in. lg, 1.852 in. dia; "D" shaft, 9/16 in. lg, 7/32 in. dia; COC No. 58948-DH2	FSK function switch
S-804		SWITCH, rotary: 2 sect, 5 pos, 2 cont each sect; 115 V ac, 1A, non-shorting; 3/4 in. lg, 1-7/8 in. w; "D" shaft, 1-1/16 in. lg, 7/32 in. dia; COC No. 58949-H2	FSK oven function switch
S-805		Same as S-101	V-809, V-810 calibrate

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
S-806		SWITCH, thermostatic: SPST; cont open w/ rising temp, 85° C p/m 3 C°; bimetal; sc adj temp range; 115 V ac, 1A, 100 W non-inductive; 1 in. lg, 5/16 in. w, 1/4 in. d; CBCA No. 13	Oven temperature control
S-808		SWITCH, rotary, solenoid: rot sw solenoid actuated; sw 1 sect, 4 pos, 12 cont, non-shorting, sil cont, 1A; solenoid, rot type, sing coil, 48 V dc, 19 ohms; stroke has 30 deg movement, CCW, 6 lb pull; sw and solenoid 6-1/4 in. lg, 1-7/8 in. dia max, flange mtg; COC No. RS-51100	Shift-multiplier
S-901		SWITCH, thermostatic: SPST; cont open w/ rising temp at 75° C, p/m 1 C°; bimetal; sc adj temp range; 115 V ac, 0.05 A, 10 W inductive; 1 in. lg, 15/16 in. w, 1/4 in. h; p/o E-914; CBCA No. 12	Temp. control for E-914
S-902		SWITCH, rotary, solenoid: rot sw solenoid actuated; sw 2 sect, 10 pos, 12 cont each sect, non-shorting, sil cont, 1A, used to sw RF; solenoid, rot type, sing. coil, 48 V dc, 19 ohms, stroke has 30 deg movement, CCW, 6 lb pull; sw and solenoid 2-27/32 in. lg, 1-7/8 in. dia max, flange mtg; COC No. RS-51103	Crystal selector drive
S-903		Same as S-102	M-901 selector
S-904		SWITCH, rotary: 1 sect, 10 pos, 1 cont; 115 V, 1A, non-shorting; wafer only; COC No. 61245-DHC	Crystal selector
S-1001		Same as S-502	Power on-off
S-1002		SWITCH, rotary: 1 sect, 3 pos, 2 cont; 115 V ac, 1A, shorting; 5/8 in. lg, 1-7/8 in. w; "D" shaft, 3/4 in. lg, 1/4 in. dia; COC No. 58951-H1	M-1001 selector
S-1101		SWITCH, rotary, solenoid: rot sw solenoid actuated; sw 1 sect, 5 pos, 12 cont, non-shorting, sil cont, 110 V ac, 1A, used to sw RF; solenoid, rot type; sing. coil 48 V dc, 19 ohms, stroke has 30 deg movement, CCW, 6 lb pull; sw and solenoid 17-29/64 in. lg, 1-7/8 in. dia max, w/ coupling on sw shaft at 2-11/16 in. from back of solenoid flange, flange mtg; COC No. RS-51099	Drive excitor-IPA band selectors

S-1102		SWITCH, rotary: 1 sect, 5 pos, 2 cont; 115 V ac, 1A, shorting; 1/2 in. lg, 1-7/8 in. w; "D" shaft, 9/16 in. lg, 1/4 in. dia; COC No. 58947-H1	M-1101 metering selector
S-1103		SWITCH, lever, pile-up: 3 pos, 1 open 1 lock 1 non-lock per Ref Dwg Gr 4; 115 V ac, 10 A; 3-3/8 in. lg, 15/16 in. w, 1 in. d; bat. handle 1 in. lg, 1/4 in. dia; CAU No. LK-5-A3E	Test key
S-1104		SWITCH, rotary: 2 sect, 10 pos, 1 cont each sect; 115 V, 1A, non-shorting; wafer only; COC No. 58953-H	Channel seeking and remote channel meter multiplier selector
S-1105		SWITCH, sensitive: SPDT; 600 V ac, 2A; 1-15/16 in. lg, 11/16 in. w, 29/32 in. thk; plunger type actuator, 21/32 in. from mtg hole, 0.007 in. approx pre-travel, 0.007 in. approx over-travel; 4 lb 10 oz operating force: 2 pos; momentary; COL - 260000900	p/o O-1109
S-1106		SWITCH, rotary: wafers only; 3 wafers; first wafer 5 pos, 1 cont; second wafer 5 pos, 2 cont; third wafer 5 pos, 1 cont; each wafer contacts rated 115 V ac, 1A; shorting; COC No. 58592-HC	Excitor-IPA band selector
S-1301		SWITCH, rotary: 2 sect, 24 pos, 1 cont each sect; 115 V ac, 1A, non-shorting; 1-7/16 in. lg, 2-1/2 in. w; "D" shaft, 1-5/16 in. lg, 1/4 in. dia; COC No. 60333-MF2	P. A. grid tank control
S-1302		SWITCH, rotary: 1 sect, 24 pos, 1 cont; 115 V ac, 1 A, non-shorting; wafer only; COC No. 60334-MF	P. A. plate tank control
S-1303		SWITCH, rotary: 3 wafers only; 10 pos, each 1 cont; 115 V ac, 1 A, non-shorting; 1-5/16 in. dia; "D" shaft, COC No. 58954-H	P. A. and ant. match channel info. - FSK mult. SW info.
S-1304 thru S-1313		SWITCH, rotary: 2 sect, 8 pos, 1 cont each sect; 115 V ac, 1 A, non-shorting; 7/8 in. lg, 1-5/16 in. w; "D" shaft, 9/16 in. lg, 7/32 in. dia; COC No. 58946-F2	Excitor, IPA and P. A. grid range selectors
S-1314 thru S-1323		SWITCH, rotary: 1 sect, 10 pos, 1 cont; 115 V ac, 10A, non-shorting; 1/2 in. lg, 1-5/16 in. w; "D" shaft, 9/16 in. lg, 7/32 in. dia; COC No. 58943-F1	P. A. and output tank coils band selectors

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
S-1324		SWITCH, rotary: 2 sect, 12 pos, 1 cont each sect; 115 V ac, 1 A, shorting; 4 in. lg, 3-5/16 in. w; rd shaft, 1-1/2 in. lg, 1/4 in. dia; CBIK No. 3878	P. A. grid
S-1325		SWITCH, rotary: 2 sect, 12 pos, stator "A" top has 1, bottom has 7 moving cont, stator "B" has 1 moving cont; 6000 V ac, 90 A, non-shorting; 10-3/16 in. lg, 8-1/4 in. w; rd shaft, 3 in. lg, 3/8 in. dia; 3 tapped holes for 10-32 NF-2 mtg sc, 3-29/32 in. r 90 deg apart; CPD No. L-16233	P. A. plate
S-1326		SWITCH, thermostatic: radiation type; self reset; SPDT; cont close w/ rising temp; infra-red sensitive metallic element actuates micro-sw; temp range is nut adj; 250 V ac, 5 A; 3-7/8 in. lg, 1 in. w, 3/4 in. h; CFT NL-925467	V-1301/2 overload protection
S-1401		Same as S-1302	Output tank control
S-1402		Same as S-1302	Fixed load capacitor selector control
S-1403		SWITCH, rotary: 1 wafer only, 12 pos, 1 cont; 115 V ac, 1 A; shorting; COC No. 58954-H	Output channel selector
S-1404 thru S-1413		SWITCH, rotary: 1 sect, 9 pos, 1 cont; 115 V ac, 1 A, shorting; 5/8 in. lg, 1-5/16 in. w; "D" shaft, 9/16 in. lg, 7/32 in. dia; COC No. 58944-F1	Fixed load capacitor selector
S-1414		SWITCH, rotary: 2 sect, 12 pos, stator "A" top has 1 moving cont, bottom has 7 stator "B" has 1; 6000 V dc, 90 A, non-shorting; 9-15/16 in. lg, 8-1/4 in. w; rd shaft, 2-3/4 in. lg, 3/8 in. dia, 3 tapped holes for 10-32 NF-2 mtg sc, 3-29/32 in. r 90 deg apart CPD No. L-16275	Output tank
S-1415		SWITCH, rotary: 4 sect, 12 pos, stators "B", "C", "D" have 1 moving cont each; 6000 V dc, 90 A, non-shorting; 12-1/8 in. lg, 8/14 in. w; rd shaft, 5 in. lg, 3/8 in. dia, 3 tapped holes for 10-32 NF-2 mtg sc, 3-29/32 in. r 90 deg apart and 2 foot brackets; CPD No. L-16252	Capacitor loading SW

S-1501		SWITCH, pressure: SPST; vane type pressure element, 5/8 in. sq; cont close w/ increasing pressure; vane cut for 1500 cfm air flow, adj only to higher cfm air flow by reducing area of vane; 250 V ac; 1-1/2 in. lg, 1-1/4 in. sq, plus vane; The Henry G. Dietz Company, 12-16 Astoria Blvd, L. I. C. No. 2, NYC, part No. 103-A	Air switch mod. duct
S-1502		SWITCH, sensitive: SPDT; 250 V ac, 5A; 1-3/4 in. lg, 1-1/4 in. w, 1/2 in. thk; actuator, roller-lever, 3/16 in. from mtg hole, 1/2 in. tot travel, 3/32 in. pre-travel, 5/32 in. over travel; 2-3/4 lbs operating force; 2 pos; momentary; locking; CMU No. 3AC6	Door interlock
S-1503		SWITCH, rotary: 1 sect, 2 pos, 3 cont; 115 V ac, 1A, shorting; 5/8 in. lg, 1-7/8 in. w, "D" shaft, 9/16 in. lg, 7/32 in. dia; COC No 59829-DH1	Service meter range selector
S-1601		Same as S-1502	Door interlock
S-1602		Same as S-1502	Door interlock
S-1701		Same as S-1501	Air switch
S-1702		Same as S-1502	Door interlock
T-106		TRANSFORMER, IF: 875-900Kc; two windings, pri 100 turns 38 AWG S. S. E. ins, sec 100 turns 38 AWG S. S. E. ins; 1-5/32 in. sq, 2-33/64 in. lg; both windings tuned, core tuning, adj located top and bottom; includes C-132, C-134, C-136, C-137; CAI No. 41-466	Coupling V-108 to V-109
T-107		Same as T-106 except includes C-133, C-135, C-138, C-139	Coupling to V-109 to V-110
T-108		TRANSFORMER, IF: 800Kc; two windings, pri 100 turns 38 AWG S. S. E. ins, sec 100 turns 38 AWG S. S. E. ins; 1-5/32 in. sq, 2-33/64 in. lg; both windings tuned, core tuning, adj located top and bottom; includes C-142, C-144, C-240, C 241; CAI No. 41-467	Coupling V-110 V-111
T-109		Same as T-108 except includes C-146, C-147, C-242, C-243	Coupling V-111 V-127
T-111		TRANSFORMER, IF: 100 Kc; 3 windings, top 500 turns 36 AWG S. S. E. ins, middle 300 turns 36 AWG S. S. E. ins w/ tap at 150, bottom has 150 turns 36 AWG S. S. E. ins; 1-5/32 in. sq, 2-33/64 in. lg; top and bottom windings tuned, core tuning, adj located top and bottom; includes C-122, C-149, C-246, C-247; CAI No. 41-468	V-125 and V-126 coupling

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
T-113		TRANSFORMER, RF: 2.0-4.5 Mc; two windings, inner 45 turns 30 AWG D.E. ins, outer 6 turns 30 AWG D.E. ins; 1-1/2 in. lg, 1-7/16 in. w, 2 in. h; CAI No. 41-470	Output transformer
T-301		TRANSFORMER, AF: MIL TF1A11YY; input type; impedance data, pri No. 1 500-ohm, ct; pri No. 2 70-ohm; sec 40,000-ohm, ct; 500 V rms test; 1-7/8 in. lg, 1-5/8 in. w, 3 in. h, studs 31/64 in. h; pri No. 1 to sec is 1 to 4 turns; pri No. 2 to sec is 1 to 3.2 turns; 100-5000 cps range, p/m 1 db; not tuned; per MIL-T-27; CBIK No. 4088	Mic. input
T-302		TRANSFORMER, AF: MIL TF1A15YY; plate coupling type; impedance data, pri No. 1 20,000-ohm; pri No. 2 20,000-ohm; sec 20,000-ohm; 6 ma dc each pri, 6 ma dc sec; 1000 V rms test; 2-1/4 in. lg, 2-1/8 in. w, 4 in. h, studs, 15/32 in. h; 1 to 1 turns ratio; 100-5000 cps range, p/m 1 db; not tuned; per MIL-T-27; CBIK No. 4089	Audio coupling
T-303		TRANSFORMER, AF: MIL TF1A15YY plate coupling type; impedance data; pri 10,000-ohm, sec 40,000-ohm ct; 10 ma dc in sec; 1000 V rms test; 1.625 in. lg, 1.065 in. w, 3 in. h, studs 15/32 in. h; 0.2 w audio level; 1 to 2 turns ratio; 100-5000 cps range, p/m 1 db; not tuned; per MIL-T-27; CBIK No. 3932	Audio coupling
T-304		TRANSFORMER, AF: MIL TF1A12YY; driver; impedance of pri, 8000-ohm ct; 40 ma dc in pri; 1000 V rms test; 2-1/4 in. lg, 2-1/8 in. w, 2-3/4 in. h, studs 1/2 in. h; 2 w audio level; 1 to 1 turns ratio; 150-4000 cps range, p/m 1 db; not tuned; per MIL-T-27; CBIK No. 3930	Drive coupling transformer
T-305		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed, metal case; pri, 210/220/230 V, 50/60 cps, one phase; sec, 6.3 V ct, 5.0A; 1000 V rms test; 2-15/16 in. lg, 2-9/16 in. w, 4-1/4 in. h; per MIL-T-27; CBIK No. 4096	Fil-transformer
T-306		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed, metal case; pri, 210/220/230 V, 50/60 cps, one phase; sec No. 1, 7.5 V ct, sec No. 2, 7.5 V ct, 21 A each winding; pri 1000 V rms test, sec 2500 V rms test; 5-1/2 in. lg, 5 in. w, 6 in. h, studs 1-5/32 in. h; per MIL-T-27; CBIK No. 3929	Modulator fil. transformer

T-401		Same as T-301	Mic. input
T-402		TRANSFORMER, AF: MIL TF1A15YY; plate coupling type; impedance data, pri 7500-ohm, sec 500-ohm ct; 35 ma dc in pri; 1500 V rms test; 2-1/4 in. lg, 2-1/8 in. w, 3 in. h, studs 15/32 in. h; 3.5 w audio level; 3.86 to 1 turns ratio; 100-5000 cps range, p/m 1 db; not tuned; per MIL-T-27; CBIK No. 4090	Output to transmitter
T-403		TRANSFORMER, power, step-down, step-up: MIL TF1A03YY; herm sealed, metal case; pri, 105/110/115V, 50/60 cps, one phase; sec No. 1 is 600 V at 0.06 A, No. 2 is 6.3 V at 2.0 A, No. 3 is 5.0 V at 3.0A each ct; pri 1000 V rms test, sec 2500 V rms test each; 4-1/8 in. lg, 3-1/2 in. w, 4-1/2 in. h, terms are 13/16 in. h; per MIL-T-27; CBIK No. 3936	Plate-fil. power
T-501		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed, metal case; pri, 210/220/230 V, 50/60 cps, one phase; sec, 3 windings each 5.0 V at 10A; pri 1000 V rms test, sec 7000 V rms test each; 5 in. lg, 4-1/8 in. w, 6 in. h, terms. are 1-5/32 in. h; per MIL-T-27; CBIK No. 4091	V-536, V-537 V-538 filament PP-1198
T-502		Same as T-501	V-539, V-540 V-541 filament PP-1198
T-504		TRANSFORMER, power, step-down: MIL TF1A03YY; herm sealed, metal case; pri, 210/220/230 V, 50/60 cps, one phase; sec No. 1 is 70 V, No. 2 is 115 V, 1A each winding; 1000 V rms test; 5 in. lg, 4-1/8 in. w, 6 in. h, terms are 13/32 in. h; per MIL-T-27; CBIK No. 4092	Ovens and DC relay supply PP-1198
T-505		TRANSFORMER, power, step-up: MIL TF1A02YY: herm sealed, metal case; pri, 200/210/220/230 V, 50/60 cps, one phase; sec No. 1 is 1280 V at 0.9A, No. 2 is 1310 V at 0.3A each ct; pri 1000 V rms test, sec 2500 V rms test; 8-3/4 in. lg, 7-1/2 in. w, 7-3/4 in. h, studs 1 in. h; per MIL-T-27; CBIK No. 3954	+1000 V supply PP-1198
T-506		TRANSFORMER, power, step-down, step-up: MIL TF1A03YY; herm sealed; metal case; pri, 210/220/230 V, 50/60 cps, one phase; sec No. 1 is 900 V at 0.5 A, No. 2 is 5.0 V at 6.0 A, each ct; pri 1000 V rms test, sec 2000 V rms test; 6-3/4 in. lg, 5 in. w, 5-1/2 in. h, terms are 13/16 in. h; per MIL-T-27; CBIK No. 3955	Bias supply PP-1198
T-507		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed, metal case; pri, 200/210/220/230 V, 50/60 cps, one phase; sec, two windings each 2.5 V, 10 A, ct; pri 1000 V rms test, sec 2500 V rms test each; 3-1/8 in. lg, 3 in. w, 4 in. h, terms are 13/16 in. h; per MIL-T-27; CBIK No. 4093	Fil. supply for V-530/V-533 PP-1198

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
T-508		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed, metal case; pri, 200/210/220 V, 50/60 cps, one phase; sec No. 1 is 6.3 V at 5.5 A No. 2 is 6.3 V at 1.0 A, each ct; pri 1000 V rms test, sec 2500 V rms test; 3-1/8 in. lg, 3 in. w, 4 in. h, terms. are 13/16 in. h; per MIL-T-27; CBIK No. 4094	Fil. supply for V-518/V-523 PP-1198
T-509		TRANSFORMER, power, fixed autotransformer: herm sealed, metal case; input-output taps adj to 200/210/220/230/240 V, 50/60 cps, three phase, 23A line cap; 7 in. lg, 5-1/4 in. w, 5-1/8 in. h; CBIK No. 4099	Main power input PP-1198
T-510		Same as T-509	Main power input PP-1198
T-801		TRANSFORMER, IF: 2.0-4.2 Mc; two windings, No. one 46 turns 32 AWG 0.9-ohm dc, No. two 8 turns 32 AWG 0.9-ohm dc, tap at 23 turns on pri; 2-1/2 in. lg, 1 in. w, form LS7 per CAMP; both windings tuned, slug, adj located top of form; also includes R-819, C-806, L-801, L-802, L-803; CBIK No. 3771-1	V-801, V-802 output
T-802		TRANSFORMER, IF: 2.0-4.2 Mc; two windings, No. one 10 turns 32 AWG 0.1-ohm dc, No. two 46 turns 32 AWG 1.0-ohm dc; 2-1/2 in. lg, 1 in. w, form LS7 per CAMP; pri tuned, slug, adj located top of form; also includes R-820, R-821, C-807/9, L-804, L-805, L-806; CBIK No. 3771-2	V-803 input
T-803		TRANSFORMER, RF: 200 Kc; two windings, pri 1 pi 225 turns 41 AWG 17-ohm dc, sec 2 pi 225 turns 41 AWG 40-ohm dc; 2-1/2 in. lg, 1 in. w, form LS7 per CAMP; pri tuned, slug, adj located top of form; CBIK No. 3767	V-808 feedback
T-901		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed, metal case; pri 210/220/230 V, 50/60 cps, one phase, sec 12.6 V at 2.5 A ct; pri 1000 V rms test, sec 1600 V rms test; 2-15/16 in. lg, 2-9/16 in. w, 4-1/4 in. h; per MIL-T-27; CBIK No. 4097	HR-901 and fil. power
T-902		TRANSFORMER, RF: 2-4 Mc; two windings, pri 1 pi 80 turns 30 AWG 1.2-ohm dc, sec 1 pi 17 turns 30 AWG 0.2-ohm dc; 2-1/2 in. lg, 1 in. w, form LS7 per CAMP; pri tuned, slug, adj located top of form; CBIK No. 3857	Output RF

T-1001		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed, metal case; pri 210/220/230 V, 50/60 cps, one phase, sec No. one 5.0 V at 4A, No. two thru five 6.3 V at 0.6-10-9-3A, respectively; pri 1000 V rms test, sec 2500 V rms test each; 5 in. lg, 4-1/8 in. w, 5-1/4 in. h, terms are 13/16 in. h; per MIL-T-27; CBIK No. 3937	MO/FSK fil. power
T-1002		TRANSFORMER, power, step-up: MIL TF1A03YY; herm sealed, metal case; pri 200/210/220/230 V, 50/60 cps, one phase, sec No. one 680 V at 450 ma, No. two 18 V at 1.2 A, sec No. one is ct; pri 1000 V rms test, sec No. one 1680 V rms test, sec No. two 1500 V rms test; 5-1/2 in. lg, 5 in. w, 5-1/2 in. h, terms are 13/16 in. h; per MIL-T-27; CBIK No. 3935	MO/FSK plate and fil.
T-1101		TRANSFORMER, power, step-down: MIL TF1A01YY; herm sealed metal case; pri 210/220/230 V, 50/60 cps, one phase, sec 6.0 V at 7.0 A ct; 1000 V rms test; 3-1/8 in. lg, 3 in. w, 4 in. h, studs are 15/32 in. h; per MIL-T-27; CBIK No. 3934	IPA filament power
T-1102		TRANSFORMER, power, step-down: MIL TF1A10YY; herm sealed, metal case; pri 210/220/230 V, 50/60 cps, one phase, sec No. one and two 6.3 V at 3.0 A ct; pri 1000 V rms test, sec 500 V rms test each; 3-1/8 in. lg, 3 in. w, 4 in. h, studs are 15/32 in. h; per MIL-T-27; CBIK No. 3938	Excitor-keyer fil. power
T-1301		Same as T-306	V-1301/2 fil. power
T-1501		TRANSFORMER, AF: MIL TF1A14YY; modulation type; impedance data, pri 7000-ohm ct, sec No. one 4000-ohm w/ tap at 3650-ohm, sec No. two 1000-ohm w/ taps at 75% and 60%; 1.05A dc in pri, 1 to 1.1A dc in sec; 10,000 V rms test; 13-1/2 in. lg, 10 in. w, 11 in. h; 2 KW audio level; turns ratio 1.56 to 1 tot w/ pri to sec No. two 1 to 5; 150-3500 cps range, p/m 1 db; not tuned; per MIL-T-27; CBIK No. 4132	Modulation transformer
T-1603		TRANSFORMER, power, step-up: MIL TF1A02YY; herm sealed, metal case; pri 210/220/230 V, 50/60 cps, three phase, 1000 V rms, sec 4000 V at 2.0 A; 9000 V rms; 20-1/4 in. lg, 11-1/4 in. w, 15-1/4 in. h, lugs are 2-1/8 in. h; per MIL-T-27; CBIK No. 4098	Plate transformer 4000 V supply
TB-111		TERMINAL BOARD: thermo plastic; 10 terms, double screw; barrier type; 13/32 in. h, 7/8 in. w inc barrier, terms 3/8 in. c/c; CBZG No. 600-10	Sub-chassis connections
TB-112		TERMINAL BOARD: thermo plastic; 4 terms, double screw; barrier type; 13/32 in. h, 7/8 in. w inc barrier, terms 3/8 in. c/c; CBZG No. 600-4	B-101 connections

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
TB-402		TERMINAL BOARD: thermo plastic; 2 terms., double screw; barrier type; 13/32 in. h, 7/8 in. w inc barrier, terms., 3/8 in. c/c; CBZG No. 600-2	Line input connections
TB-403		TERMINAL BOARD: thermo plastic; 20 terms., double screw; barrier type; 1/2 in. h, 1-5/8 in. w inc barrier, terms., 7/16 in. c/c; CBZG No. 601-20	Input and output connections
TB-501		TERMINAL BOARD: glass melamine; 7 terms., single screw; no barrier; 8-3/8 in. lg, 1-1/4 in. w, 1/4 in. thk; CBIK No. 3820	AC power input
TB-502		TERMINAL BOARD: glass melamine; 16 terms., single screw; no barrier; 15 in. lg, 1-1/4 in. w, 1/4 in. thk; CBIK No. 3396	AC power distribution PP-1198
TB-507		TERMINAL BOARD: thermo plastic; 8 terms., double screw; barrier type; 5/8 in. h, 1-5/16 in. w inc barrier, terms., 9/16 in. c/c; CBZG No. 602-8	Top PP-1198
TB-508		TERMINAL BOARD: thermo plastic; 17 terms., double screw; barrier type; 5/8 in. h, 1-5/16 in. w inc barrier, terms., 9/16 in. c/c; CBZG No. 602-17	Bottom PP-1198
TB-509		Same as TB-508	Bottom PP-1198
TB-510		Same as TB-508	Bottom PP-1198
TB-518		Same as TB-508	Top PP-1198
TB-813		TERMINAL BOARD: thermo plastic; 3 terms., double screw; barrier type; 13/32 in. h, 7/8 in. w inc barrier, terms., 3/8 in. c/c; CBZG No. 600-3	E-895 heater connections
TB-814		TERMINAL BOARD: thermo plastic; 5 terms., double screw; barrier type; 1/2 in. h, 1-1/8 in. w inc barrier, terms., 7/8 in. c/c; CBZG No. 601-5	S-808 connections
TB-815		Same as TB-112	B-801 connections
TB-1401		TERMINAL BOARD: thermo plastic; 15 terms., double screw; barrier type; 13/32 in. h, 7/8 in. w inc barrier, terms. 3/8 in. c/c; CBZG No. 600-15	Output network interconnections

TB-1402		TERMINAL BOARD: thermo plastic; 5 terms., double screw; barrier type; 13/32 in. h, 7/8 in. w inc barrier, terms. 3/8 in. c/c; CBZG No. 600-5	Output network interconnections
TB-1501		Same as TB-403	Mod. bay interconnections
TB-1502		Same as TB-403	Mod. bay interconnections
TB-1503		Same as TB-403	Mod. bay interconnections
TB-1504		Same as TB-403	Mod. bay interconnections
TB-1701		Same as TB-403	R. F. bay interconnections
TB-1702		Same as TB-403	R. F. bay interconnections
TB-1703		TERMINAL BOARD: thermo plastic; 6 terms., double screw; barrier type; 5/8 in. h, 1-5/16 in. w inc barrier, terms 9/16 in. c/c; CBZG No. 602-6	R. F. bay interconnections
TB-1704		Same as TB-814	B-1702 connections
V-101		ELECTRON TUBE: JAN 5670	100 Kc osc. amp
V-102		Same as V-101	50 Kc multi-vibrator
V-103		Same as V-101	25 Kc multi-vibrator
V-104		ELECTRON TUBE: JAN 5654	Spectrum amp. 9.11 to 21.6 mc
V-105		Same as V-104	Spectrum amp. 9.11 to 21.6 mc
V-107		Same as V-104	100 Kc buffer amp.
V-108		ELECTRON TUBE: JAN 5750	Mixer #1

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
V-109		Same as V-104	875 to 900 Kc IF amp.
V-110		Same as V-108	Mixer #2
V-111		Same as V-104	800 Kc IF amp.
V-112		Same as V-108	Freq. multiplier
V-113		Same as V-104	Freq. multiplier
V-114		ELECTRON TUBE: JAN 5686	Output amp.
V-115		Same as V-101	3rd divider
V-116		Same as V-101	2nd divider
V-117		Same as V-101	1st divider
V-118		Same as V-104	Buffer amp.
V-119		Same as V-114	AFC power amp.
V-120		Same as V-114	AFC power amp.
V-121		Same as V-114	AFC power amp.
V-122		Same as V-114	AFC power amp.
V-123		Same as V-101	AFC driver
V-124		Same as V 101	AFC driver
V-125		ELECTRON TUBE: JAN 5726	100 Kc mixer
V-126		Same as V-125	100 Kc mixer
V-127		Same as V-108	100 Kc amp.

V-128		ELECTRON TUBE: JAN 5749	Regenerative divider
V-129		Same as V-104	Regenerative divider
V-301		ELECTRON TUBE: JAN 6SL7WGT	Audio amplifier
V-302		ELECTRON TUBE: type 6C8G; RCA	Audio limiter
V-303		Same as V-302	Audio squelch
V-304		ELECTRON TUBE: JAN 6SJ7WGT	Audio amplifier
V-305		ELECTRON TUBE: JAN 6X5WGT	Limiter diode
V-306		ELECTRON TUBE: JAN 6SN7WGT	Audio driver
V-307		Same as V-306	Audio driver
V-308		Same as V-306	MCW oscillator
V-309		ELECTRON TUBE: JAN 4/1000A; EIMAC	Modulator
V-310		Same as V-309	Modulator
V-401		ELECTRON TUBE: JAN 6J5	Input amplifier
V-402		Same as V-401	Output amplifier
V-403		ELECTRON TUBE: JAN 5R4GY	Power supply rectifier
V-404		ELECTRON TUBE: JAN 6L6G	Series tube
V-405		ELECTRON TUBE: JAN 6SH7	Power supply amp-control
V-406		ELECTRON TUBE: JAN OA3/VR75	Voltage reg. power supply
V-407		Same as V-406	Voltage reg. power supply
V-518		ELECTRON TUBE: JAN 807	Series tube +1000 V supply

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
V-519		Same as V-518	Series tube +1000 V supply
V-520		Same as V-518	Series tube +1000 V supply
V-521		Same as V-518	Series tube +1000 V supply
V-522		Same as V-518	Series tube +1000 V supply
V-523		Same as V-518	Series tube +1000 V supply
V-524		ELECTRON TUBE: JAN 6AU6WA	Regulator tube +1000 V power supply
V-525		ELECTRON TUBE: JAN OA2WA	Reference tube +1000 V power supply
V-526		Same as V-525	Reference tube +1000 V power supply
V-527		Same as V-525	Reference tube +1000 V power supply
V-528		Same as V-525	Reference tube +1000 V power supply
V-529		Same as V-525	-127 bias supply
V-530		ELECTRON TUBE: JAN 3B28	+500 V rectifier

V-531		Same as V-530	+500 V rectifier
V-532		Same as V-530	+1000 V rectifier
V-533		Same as V-530	+1000 V rectifier
V-534		Same as V-530	Bias rectifier
V-535		Same as V-530	Bias rectifier
V-536		ELECTRON TUBE: JAN 4B32	+4200 V rectifier
V-537		Same as V-536	+4200 V rectifier
V-538		Same as V-536	+4200 V rectifier
V-539		Same as V-536	+4200 V rectifier
V-540		Same as V-536	+4200 V rectifier
V-541		Same as V-536	+4200 V rectifier
V-801		Same as V-108	Balanced modulator
V-802		Same as V-108	Balanced modulator
V-803		Same as V-128	Intermediate amplifier
V-804		Same as V-114	Power amplifier
V-805		Same as V-125	Switching diode
V-806		Same as V-101	FSK keyer

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
V-807		Same as V-524	Phase shift osc.
V-808		Same as V-524	200 Kc osc.
V-809		Same as V-524	Reactance tube
V-810		Same as V-524	Reactance tube
V-811		ELECTRON TUBE: JAN 5814A	Phase inverter
V-812		ELECTRON TUBE: JAN 6J6	Buffer amplifier
V-901		Same as V-104	Oscillator
V-902		ELECTRON TUBE: JAN 6AG7	RF amplifier
V-903		Same as V-406	Voltage regulator
V-904		Same as V-406	Voltage regulator
V-1001		Same as V-403	Rectifier +240 and +160 V supply
V-1002		Same as V-403	Rectifier +240 and +160 V supply
V-1003		ELECTRON TUBE: JAN 6X4W	Rectifier-105 V
V-1004		ELECTRON TUBE: JAN OB2WA	Regulator -105 V
V-1005		ELECTRON TUBE: JAN 6AS7G	Series tube +240 V supply
V-1006		Same as V-1005	Series tube +240 V supply

V-1007		Same as V-1005	Series tube +240 V supply
V-1008		Same as V-524	Amplifier control +240 V
V-1009		Same as V-404	Series tube +160 V supply
V-1010		Same as V-524	Amplifier control +160 V
V-1101		ELECTRON TUBE: JAN 6V6GT	1st multiplier in excitor
V-1102		Same as V-1101	2nd multiplier in excitor
V-1103		Same as V-518	3rd multiplier in excitor
V-1104		ELECTRON TUBE: JAN 4/65A; EIMAC	Int. power amplifier
V-1105		Same as V-1104	Int. power amplifier
V-1106		Same as V-1005	Series tube 220 V reg. supply
V-1107		Same as V-405	Amplifier control 220 V reg. supply
V-1201		Same as V-811	1st keyer stage
V-1202		Same as V-811	2nd keyer stage
V-1203		Same as V-811	3rd keyer stage
V-1204		Same as V-1004	Voltage reg.
V-1301		Same as V-309	RF power amplifier
V-1302		Same as V-309	RF power amplifier

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
W-1501		CABLE ASSEMBLY: 3 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric, copper braid shielding; 1 ft. 3" lg overall, approx. 1 ft. 1 in. lg. excluding terminations, approx. 0.187 in. dia. overall cross-section of cable; slug P-306-CCT on first end, slug S-306-CCT on second end; JAN-C-76 CBIK No. 4325	Speech amp to mod.
W-1502		CABLE ASSEMBLY: 10 cables laced, AWG #18 SRIR 1000 V wires, 7 strands, plastic dielectric; 1 ft. 8 in. lg overall, approx. 1 ft. 6 in. lg excluding terminations, approx. 0.312 in. dia. overall cross-section of cable; plug P-312-CCT on first end, plug S-312-CCT on second end; JAN-C-76 CBIK No. 4326	Crystal osc. to excitation control
W-1503		CABLE ASSEMBLY: 10 cables laced, AWG #18 SRIR 1000 V copper wires 7 strands, plastic dielectric; 3 ft. 2-1/2 in. lg. overall, approx. 3 ft. 1/2 in. lg excluding terminations, approx. 0.312 in. dia. overall cross-section of cable; plug S-315-CCT on both ends; JAN-C-76 CBIK No. 4327	MO to excitation control
W-1504		CABLE ASSEMBLY, MOD. BAY: 113 cables laced, 109 cables each AWG #18 SRIR 1000 V copper wires, strands, plastic dielectric, 7 cables with copper braid shielding, 4 cables each AWG #16 SRIR 1000 V copper wires, 19 strands, plastic dielectric, approx. 12 ft 7-1/2 in. lg overall, approx. 0.750 in. dia. overall cross-section of cable; cables terminate in plugs P-801, P-806, P-101, P-302, P-301, P-1002, P-305, P-1001, P-701, P-708, P-901, P-802, 14 bare ends, 1 TOM-#6 solder lug, 9 Patton MacGuyer #1964 lug, 8 Patton MacGuyer #2031 lugs, 2 TOM #4 solder lugs, 73 KKE-#601-SLS lugs; JAN-C-76 CBIK No. 4328	Mod. bay inter cable
W-1505		CABLE ASSEMBLY, RADIO FREQUENCY: coaxial, 50 ohms nom impedance; AN-RG58U; JAN-C-76 both ends terminated w/ AN/UG-88/U fitting P-903 and P-706 19 in. lg. CBIK No. 4289-1	Crystal osc. excitation control
W-1506		CABLE ASSEMBLY, RADIO FREQUENCY: coaxial, 50 ohms nom impedance; AN-RG58U; JAN-C-76 both ends terminated w/ AN/UG-88/U fitting P-803 and P-704 22 in. lg. CBIK No. 4289-2	FSK to excitation control
W-1507		CABLE ASSEMBLY, RADIO FREQUENCY: coaxial, 50 ohms nom impedance; AN-RG58U; JAN-C-76 both ends terminated w/ AN/UG-88/U fitting P-804 and P-703 22 in. lg. CBIK No. 4289-3	FSK to excitation control

W-1508		CABLE ASSEMBLY, RADIO FREQUENCY: coaxial, 50 ohms nom impedance; AN-/RG58U; JAN-C-76 both ends terminated w/ AN/UG-88/U fitting P-107 and P-705 41 in. lg. CBIK No. 4289-4	MO to excitation control
W-1509		CABLE ASSEMBLY, RADIO FREQUENCY: coaxial, 50 ohms nom impedance; AN-RG58U; JAN-C-76 both ends terminated w/ AN/UG-88/U fitting P-707 and P-1103 93 in. lg. CBIK No. 4289-5	Excitation control to EXCITOR-IPA
W-1601		CABLE ASSEMBLY: 72 cables laced, AWG #18 SRIR 1000 V copper wire, 7 strands, plastic dielectric, 4 cables shielded with copper braid, approx. 11 ft. 5 in. lg overall, approx. 0.750 in. dia. overall cross-section of cable; cables terminate in 105 KKE-#601-SLS lugs, 35 KKE-#602-SLS lugs, 4 TOM-#4 solder lugs; JAN-C-76 CBIK No. 4329	Inter bay cable
W-1602		CABLE ASSEMBLY: 8 cables laced, 1 AWG #18 8000 V copper wire, 16 strands, plastic dielectric, 7 #16 10,000 V, copper wires, 19 strands synthetic rubber dielectric, 11 ft. 11 in. lg overall, approx 11 ft. 9 in. lg excluding terminations, approx. 0.500 in. dia. overall cross-section of cable; cables terminate in plug P-1303, and 15 Patton MacGuyer #2007 lugs; JAN-C-76 CBIK No. 4360	HV interconnection cable
W-1603		CABLE ASSEMBLY: 6 cables laced, AWG #8 SRIR 1000 V copper wire, 133 strands, plastic dielectric; 2 ft 7/8 in. lg overall, approx 1 ft 10-7/8 in. lg. excluding terminations, approx 0.750 in dia overall cross-section of cable; cables terminate in 8 HGB #33461 lugs, JAN-C-76 CBIK No. 4361	Plate transformer primary cable
W-1604		CABLE ASSEMBLY: 15 cables laced, 9 AWG #16 10,000 V copper wire, 19 strands, synthetic rubber dielectric, 6 AWG #8 SRIR 1000 V copper wire, 133 strands, plastic dielectric, 10 ft. 4 in. lg. overall, approx 10 ft. 2 in. lg. excluding terminations, approx. 0.875 in. dia overall cross-section of cable; lugs; JAN-C-76 CBIK No. 4362	HV and line cable, power bay
W-1605		CABLE ASSEMBLY: 20 cables laced, 2 AWG #16 SRIR 1000 V, copper wires, 19 strands, plastic dielectric, 18 AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric, 6 ft 5 in lg overall, approx 6 ft 3 in lg excluding terminations, approx 0.375 in dia overall cross-section of cable; cables terminate in 40 HGB #602-SLS lugs; JAN-C-76 CBIK No. 4377	Power bay inter cable
W-1606		CABLE ASSEMBLY: 2 cables laced, AWG #8 SRIR 1000 V copper wires, 133 strands, plastic dielectric; 1 ft. 5-1/4 in lg overall, approx. 1 ft 3-1/4 in lg excluding terminations, approx 0.375 in dia overall cross-section of cable; cables terminate in 4 HGB #33461 lugs; JAN-C-76 CBIK No. 4379	T-509 primary

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
W-1607		CABLE ASSEMBLY: 2 cables laced, AWG #8 SRIR 1000 V copper wires, 133 strands, plastic dielectric; 1 ft 5 in lg overall, 1 ft 3 in lg excluding terminations, approx 0.375 in dia overall cross-section of cable; cables terminate in 4 HGB #33461 lugs; JAN-C-76 CBIK No. 4379	T-510 primary
W-1608		CABLE ASSEMBLY: 10 cables laced, AWG #8 SRIR 1000 V copper wire, 133 strands, plastic dielectric; 3 ft 5-1/2 in lg overall approx 3 ft 3-1/2 in lg excluding terminations, approx 0.875 in dia overall cross-section of cable; cables terminate in 20 HGB #33461 lugs; JAN-C-76 CBIK No. 4380	Line input to relay panel
W-1701		CABLE ASSEMBLY: 87 cables laced, AWG #18 SRIR 1000 V copper wire, 7 strands, plastic dielectric; 13 ft 3-7/8 in lg overall, approx 13 ft 2-7/8 in lg excluding terminations, approx. 0.750 in dia overall cross-section of cable; cables terminate in plugs P-602, P-601. P-1102, P-1101, P-1302, P-1301, P-1401, 8 Patton Mac Guyer #1964 lugs, 2 Patton Mac Guyer #2031 lugs, 2 TOM A-79 solder lugs, 6 KKE #602-SLS lugs, 42 KKE #601-SLS lugs, 2 bare ends; JAN-C-76 CBIK No. 4330	RF bay inter cable
W-1901		CABLE ASSEMBLY: 6 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric; 6 ft lg overall, 5 ft 10 in. lg excluding terminations, approx 0.250 in dia overall cross-section of cable; plug P-306-CCT on first end, plug S-306-CCT on second end; JAN-C-76 CBIK No. 4073	6 conductor test cable
W-1902		CABLE ASSEMBLY: 12 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric; 6 ft lg overall, 5 ft 10 in lg excluding terminations, approx 0.500 in dia overall cross-section of cable; plug P-312-CCT on first end, plug S-312-CCT on second end; JAN-C-76 CBIK No. 4076-1	12 conductor test cable
W-1903		CABLE ASSEMBLY: 8 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric; 6 ft lg overall 5 ft 10 in lg excluding terminations, approx 0.375 in dia overall cross-section of cable; plug P-308-CCT on first end, plug S-308-CCT on second end; JAN-C-76 CBIK No. 4075	8 conductor test cable
W-1904		Same as W-1902 CBIK No. 4076-2	12 conductor test cable

W-1905		CABLE ASSEMBLY: 15 cables laced, 2 cables each AWG #16 SRIR 1000 V copper wires, 19 strands, plastic dielectric, 13 cables each AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric; 6 ft lg overall, 5 ft 10 in lg excluding terminations, approx 0.500 in dia overall cross-section of cable; plug P-315-CCT on first end, plug S-315-CCT on second end; JAN-C-76 CBIK No. 4077	15 conductor test cable
W-1906		CABLE ASSEMBLY: 18 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric; 6 ft lg overall, 5 ft 10 in. lg excluding terminations, approx 0.525 in dia overall cross-section of cable; plug P-318-CCT on first end, plug S-318-CCT on second end; JAN-C-76 CBIK No. 4078	18 conductor test cable
W-1907		CABLE ASSEMBLY: 24 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric; 6 ft lg overall, 5 ft 10 in lg excluding terminations approx 0.625 in dia overall cross-section of cable; plug P-324-CCT on first end, plug S-324-CCT on second end; JAN-C-76 CBIK No. 4079	24 conductor test cable
W-1908		CABLE ASSEMBLY: 27 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric 6 ft lg overall, 5 ft 10 in lg excluding terminations, approx 0.650 in dia overall cross-section of cable; plug P-327-CCT on first end, plug S-327-CCT on second end; JAN-C-76 CBIK No. 4080	27 conductor test cable
W-1909		CABLE ASSEMBLY, SPECIAL PURPOSE: AWG #18 8000 V RMS copper wire, 18 strands, plastic dielectric, 2 ft.lg excluding termination, approx. 3/16 in.dia overall cross-section of cable; cable terminates in receptacle J-1303; CBIK No. 3946-2	P.A. plate voltage
W-1910		CABLE ASSEMBLY, SPECIAL PURPOSE: AWG #18 8000 V RMS copper wire, 18 strands, plastic dielectric, 9 ft. lg excluding termination, approx. 3/16 in. dia overall cross-section of cable; cable terminates in plug P-1303; CBIK No 3946-1	P.A. plate voltage
W-1911		CABLE ASSEMBLY: 4 cables laced, AWG #18 SRIR 1000 V copper wires, 7 strands, plastic dielectric 6 ft lg overall, 5 ft 10 in. lg exclusive of terminations, approx 0.187 in dia overall cross-section of cable; plug P-304-CCT on first end, plug S-304-CCT on second end; JAN-C-76 CBIK No. 4074	4 conductor test cable
XF-101		FUSEHOLDER: extractor post type; 15 amp; holds one cartridge type fuse, 1/4 in. dia, 1-1/4 in. lg; bayonet type; knob w/ center hole; CFA No. HKM-H	F-101 mounting
XF-102		Same as XF-101	F-102 mounting
XF-301		Same as XF-101	F-301 mounting
XF-302		Same as XF-101	F-302 mounting
XF-401		Same as XF-101	F-401 mounting
XF-501		Same as XF-101	F-501 mounting
XF-502		Same as XF-101	F-502 mounting

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
XF-503		Same as XF-101	F-503 mounting
XF-504		Same as XF-101	F-504 mounting
XF-505		Same as XF-101	F-505 mounting
XF-506		Same as XF-101	F-506 mounting
XF-507		Same as XF-101	F-507 mounting
XF-508		Same as XF-101	F-508 mounting
XF-509		Same as XF-101	F-509 mounting
XF-510		Same as XF-101	F-510 mounting
XF-511		Same as XF-101	F-511 mounting
XF-512		Same as XF-101	F-512 mounting
XF-513		Same as XF-101	F-513 mounting
XF-514		Same as XF-101	F-514 mounting
XF-515		Same as XF-101	F-515 mounting
XF-516		Same as XF-101	F-516 mounting
XF-801		Same as XF-101	F-801 mounting
XF-802		Same as XF-101	F-802 mounting
XF-901		Same as XF-101	F-901 mounting
XF-1001		Same as XF-101	F-1001 mounting
XF-1002		Same as XF-101	F-1002 mounting
XF-1101		Same as XF-101	F-1101 mounting
XF-1102		Same as XF-101	F-1102 mounting

XF-1301		Same as XF-101	F-1301 mounting
XI-101		LAMPHOLDER: accommodates miniature bayonet base; 1/2 W; 220 V; 1-1/2 in. lg, 13/16 in. dia; built-in resistor; (maint item for I-101); CAYZ No. 95408-9-220 V	I-101 mounting
XI-102		LAMPHOLDER: accommodates miniature bayonet base; 1/2 W; 220 V; 1-1/2 in. lg, 13/16 in. dia; built-in resistor; (maint item for I-102); CAYZ No. 95408-9-115V	I-102 mounting
XI-103		Same as XI-101 except maint item for I-103 CAYZ No. 95408-9-250 V	I-103 mounting
XI-104		LAMPHOLDER: accommodates miniature bayonet base; 6.3 V; CAYZ No. 706	I-104 mounting
XI-105		Same as XI-104	I-105 mounting
XI-106		Same as XI-104	I-106 mounting
XI-401		Same as XI-102 except maint item for I-401	I-401 mounting
XI-501		LAMPHOLDER: accommodates S-6; bayonet base; 6 W; 2 in. lg, 1-3/16 in. dia; (maint item for I-501); CAYZ No. 78202-11	I-501 mounting
XI-502		Same as XI-501 except maint item for I-502	I-502 mounting
XI-503		Same as XI-501 except maint item for I-503	I-503 mounting
XI-504		Same as XI-501 except maint item for I-504	I-504 mounting
XI-801		Same as XI-102 except maint item for I-801	Oven on
XI-802		Same as XI-103 except maint item for I-802	Plate on
XI-803		Same as XI-104	I-803 mounting
XI-901		LAMPHOLDER: accommodates miniature bayonet base; 6.3 V ac; T-3-1/4 No. 47 lamp; 1-1/2 in. lg, 1-3/16 in. dia; (maint item for I-901); CAYZ No. 95410-935	I-901 mounting
XI-902		LAMPHOLDER: accommodates miniature bayonet base; 12 V ac; T-3-1/4 No. 1813 lamp; 1-1/2 in. lg, 1-3/16 in. dia; (maint item for I-902); CAYZ No. 95410-935	I-902 mounting
XI-1001		Same as XI-101 except maint item for I-1001	I-1001 mounting
XR-1028		SOCKET, resistor, current regulating: JAN TS101P01; per JAN-S-28A; CEB	R-1028 mounting
XR-1029		Same as XR-1028	R-1029 mounting

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
XR-1030		Same as XR-1028	R-1030 mounting
XR-1031		Same as XR-1028	R-1031 mounting
XV-101		SOCKET, electron tube: JAN TS103P01; per JAN-S-28A; CEB	V-101 mounting
XV-102		Same as XV-101	V-102 mounting
XV-103		Same as XV-101	V-103 mounting
XV-104		SOCKET, electron tube: JAN TS102P01 per JAN-S-28A; CEB	V-104 mounting
XV-105		Same as XV-104	V-105 mounting
XV-107		Same as XV-104	V-107 mounting
XV-108		Same as XV-104	V-108 mounting
XV-109		Same as XV-104	V-109 mounting
XV-110		Same as XV-104	V-110 mounting
XV-111		Same as XV-104	V-111 mounting
XV-112		Same as XV-104	V-112 mounting
XV-113		Same as XV-104	V-113 mounting
XV-114		Same as XV-101	V-114 mounting
XV-115		Same as XV-101	V-115 mounting
XV-116		Same as XV-101	V-116 mounting
XV-117		Same as XV-101	V-117 mounting
XV-118		Same as XV-104	V-118 mounting

XV-119		Same as XV-101	V-119 mounting
XV-120		Same as XV-101	V-120 mounting
XV-121		Same as XV-101	V-121 mounting
XV-122		Same as XV-101	V-122 mounting
XV-123		Same as XV-101	V-123 mounting
XV-124		Same as XV-101	V-124 mounting
XV-125		Same as XV-104	V-125 mounting
XV-126		Same as XV-104	V-126 mounting
XV-127		Same as XV-104	V-127 mounting
XV-128		Same as XV-104	V-128 mounting
XV-129		Same as XV-104	V-129 mounting
XV-301		Same as XR-1028	V-301 mounting
XV-302		Same as XV-301	V-302 mounting
XV-303		Same as XV-301	V-303 mounting
XV-304		Same as XV-301	V-304 mounting
XV-305		Same as XV-301	V-305 mounting
XV-306		Same as XV-301	V-306 mounting
XV-307		Same as XV-301	V-307 mounting
XV-308		Same as XV-301	V-308 mounting
XV-309		SOCKET, electron tube: 5 cont, large; four No. 10-32 tapped holes 2-7/16 in. mtg radius 90 deg between mtg/c; aluminum body w/ Mykroy insert; 5-1/2 in. dia. 2-1/4 in. thk; accommodates a 2 in. OD air duct fitting (refer to O-1506); CIM No. 4-1000A/4000	V-309 mounting
XV-310		Same as XV-309 except u/w O-310	V-310 mounting
XV-401		Same as XV-301	V-401 mounting

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
XV-402		Same as XV-301	V-402 mounting
XV-403		Same as XV-301	V-403 mounting
XV-404		Same as XV-301	V-404 mounting
XV-405		Same as XV-301	V-405 mounting
XV-406		Same as XV-301	V-406 mounting
XV-407		Same as XV-301	V-407 mounting
XV-518		SOCKET, electron tube: 5 cont med.; 2 mtg slots 5/16 in., 0.140 in., 1-3/8 in. apart; steatite body 15/16 in. h, 1-1/4 in. dia; CJA No. K33005	V-518 mounting
XV-519		Same as XV-518	V-519 mounting
XV-520		Same as XV-518	V-520 mounting
XV-521		Same as XV-518	V-521 mounting
XV-522		Same as XV-518	V-522 mounting
XV-523		Same as XV-518	V-523 mounting
XV-524		Same as XV-104	V-524 mounting
XV-525		Same as XV-104	V-525 mounting
XV-526		Same as XV-104	V-526 mounting
XV-527		Same as XV-104	V-527 mounting
XV-528		Same as XV-104	V-528 mounting
XV-529		Same as XV-104	V-529 mounting

XV-530		SOCKET, electron tube: 4 cont, bayonet; 2 mtg holes 0.147 in. dia, 2-5/32 in. c/c; ceramic body, glazed base w/ nickel pl brass shell, 1-31/32 in. h, 2-5/8 in. dia; CNA No. XM-10	V-530 mounting
XV-531		Same as XV-530	V-531 mounting
XV-532		Same as XV-530	V-532 mounting
XV-533		Same as XV-530	V-533 mounting
XV-534		Same as XV-530	V-534 mounting
XV-535		Same as XV-530	V-535 mounting
XV-536		SOCKET, electron tube: similar to Navy type No. 49424; 50 w, 4 cont, bayonet; 2 mtg holes 13/64 in. dia, 2-13/16 in. c/c; body ceramic L-3, glazed base w/ nickel pl brass shell; CNA No. XM-50	V-536 mounting
XV-537		Same as XV-536	V-537 mounting
XV-538		Same as XV-536	V-538 mounting
XV-539		Same as XV-536	V-539 mounting
XV-540		Same as XV-536	V-540 mounting
XV-541		Same as XV-536	V-541 mounting
XV-801		Same as XV-104	V-801 mounting
XV-802		Same as XV-104	V-802 mounting
XV-803		Same as XV-104	V-803 mounting
XV-804		Same as XV-101	V-804 mounting
XV-805		Same as XV-104	V-805 mounting
XV-806		Same as XV-104	V-806 mounting
XV-807		Same as XV-104	V-807 mounting
XV-808		SOCKET, electron tube: 7 pin; miniature; CEB No. 9180	V-808 mounting
XV-809		Same as XV-808	V-809 mounting

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
XV-810		Same as XV-808	V-810 mounting
XV-811		Same as XV-101	V-811 mounting
XV-812		Same as XV-104	V-812 mounting
XV-901		Same as XV-104	V-901 mounting
XV-902		Same as XV-301	V-902 mounting
XV-903		Same as XV-301	V-903 mounting
XV-904		Same as XV-301	V-904 mounting
XV-1001		Same as XV-301	V-1001 mounting
XV-1002		Same as XV-301	V-1002 mounting
XV-1003		Same as XV-104	V-1003 mounting
XV-1004		Same as XV-104	V-1004 mounting
XV-1005		Same as XV-301	V-1005 mounting
XV-1006		Same as XV-301	V-1006 mounting
XV-1007		Same as XV-301	V-1007 mounting
XV-1008		Same as XV-104	V-1008 mounting
XV-1009		Same as XV-301	V-1009 mounting
XV-1010		Same as XV-104	V-1010 mounting
XV-1101		Same as XV-301	V-1101 mounting
XV-1102		Same as XV-301	V-1102 mounting

XV-1103		Same as XV-518	V-1103 mounting
XV-1104		SOCKET, electron tube: 7 pin, built-in base shield; 5 tube retainer springs; 4 mtg holes 0.185 in. dia on 2-5/16 in. sq; wafer base steatite; CEJ No. 122-101	V-1104 mounting
XV-1105		Same as XV-1104	V-1105 mounting
XV-1106		Same as XV-301	V-1106 mounting
XV-1107		Same as XV-301	V-1107 mounting
XV-1201		Same as XV-101	V-1201 mounting
XV-1202		Same as XV-101	V-1202 mounting
XV-1203		Same as XV-101	V-1203 mounting
XV-1204		Same as XV-104	V-1204 mounting
XV-1301		Same as XV-309 except u/w 0-1301	V-1301 mounting
XV-1302		Same as XV-309 except u/w 0-1302	V-1302 mounting
XY-801		SOCKET, crystal: 2 cont, beryllium Cu, sil pl; med; 1 in. lg, 1/2 in. w, 1/2 in. h; CEJ No. 126-105-2	Y-801 mounting
XY-901		Same as XY-801 except p/o E-914	Y-901 mounting socket
XY-902		Same as XY-801 except p/o E-914	Y-902 mounting socket
XY-903		Same as XY-801 except p/o E-914	Y-903 mounting socket
XY-904		Same as XY-801 except p/o E-914	Y-904 mounting socket
XY-905		Same as XY-801 except p/o E-914	Y-905 mounting socket
XY-906		Same as XY-801 except p/o E-914	Y-906 mounting socket
XY-907		Same as XY-801 except p/o E-914	Y-907 mounting socket
XY-908		Same as XY-801 except p/o E-914	Y-908 mounting socket
XY-909		Same as XY-801 except p/o E-914	Y-909 mounting socket
XY-910		Same as XY-801 except p/o E-914	Y-910 mounting socket

TABLE 8-2. MAINTENANCE PARTS LIST (Cont'd)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
Y-101		CRYSTAL UNIT, quartz: 100 Kc; CADI No. H-18	p/o E-111
Y-801		CRYSTAL UNIT, quartz: MIL-CR-26/u; 200 Kc; holder AN-HC-6/u; 2 pin terms., 0.243 in. lg, 0.050 in. dia, on base, 0.486 in. c/c; 0.750 in. lg, 0.345 in. w, 1.031 in. h; -40° C to +80° C range; MIL-C-3098; CADI per MIL	V-808 osc. control
Y-901 thru Y-910		CRYSTAL UNIT, quartz, MIL-CR 27/u using AN-H-6/u holder in accordance with MIL-C-3098, frequency to be specified by using agencies	Crystal oscillator 10-positions
Z-101		OSCILLATOR, RF: 1.0-1.5 Mc 0.001 W output; L/C freq control; 240 V dc req'd, external; integral coils; 4-5/8 in. lg, 2-3/4 in. w, 4-5/8 in. h, shaft ext 3/8 in. beyond h dim.; COL No. 70E11, 503-9558-003	Master osc.
Z-102		OSCILLATOR, RF: 600-800 Kc 0.001 W output; L/C freq control; 240 V dc req'd, external; integral coils; 4-5/8 in. lg, 2-3/4 in. w, 4-5/8 in. h, shaft ext 3/8 in. beyond h dim.; COL No. 70E10, 503-9550-003	Interpolation osc.
Z-103		FILTER, band pass: 75-100 Kc; layer, 4 pi wound; 220 turns each; ins; S.S.E. ceramic form; 1-5/32 in. sq, 2-23/64 in. h; includes R-169, R-170, C-160, C-161, C-178, L-101, L-103; CAI No. 37-262	Filter output interpolation circuit
Z-104		COIL, RF: single layer, 75 turns, 30 AWG, H.E. ins; 1-5/32 in. sq, 2-33/64 in. lg, includes R-168, C-200; CAI No. 41-465 modified per CBIK No. 3970	V-112 plate circuit
Z-105		COIL, RF: single layer, 11 turns, 26 AWG, H.E. ins; 1-5/32 in. sq; 2-33/64 in. lg, includes R-162, C-156; CAI No. 41-463 modified per CBIK No. 3973	V-113 plate circuit
Z-106		Same as Z-105 except includes R-137, C-119 modified per CBIK No. 3971	V-104 plate circuit
Z-107		Same as Z-105 except includes R-129, C-129, C-236; modified per CBIK No. 3972	V-105 plate circuit
Z-112		FILTER, low pass: 100 Kc; 2 one-pi windings; 500 turns each; 36 AWG, S.S.E. ins; form XXXP material; 1-5/32 in. sq, 2-33/64 in. h; includes C-248, C-249; CAI No. 41-469	V-125 and V-127 plate loads

Z-801		FILTER, band pass: when resonated as an antiresonant system (by C-805D) at frequencies between 2.0 and 4.5 Mc, provides impedance of between 25,000 and 60,000 ohms, approx, w/ dc isolation of output from input circuit. Provision for insertion of dc to input and output. 2-1/4 in. lg, 1-1/2 in. w, 3-1/4 in. h; includes, C-812/15, L-807/9; CBIK No. 3771-3	V-803 output
Z-802		FILTER, band pass: when input is resonated as an antiresonant system at frequencies between 2.0 and 4.5 Mc, provides unloaded impedance of between 25,000 and 60,000 ohms, approx, w/ dc isolation of output from input circuit. Provision for insertion of dc to input. 2-1/4 in. lg, 1-1/2 in. w, 3-1/4 in. h; includes R-832, C-817/19, L-810, L-811; CBIK No. 3771-4	V-804 output
Z-803		FILTER, low pass: pass band 0 to 960 cps, 30 db attenuation above 5000 ohm, approx; 2-1/4 in. lg, 2-1/8 in. w, 2-3/4 in. h; CBIK No. 4045	V-806 output
Z-804		PHASE SHIFT NETWORK: hi impedance input and output; 180° phase shift at 200 cps, for plate to grid coupling; one freq adj and one degeneration control, 2-3/8 in. lg, 1-13/16 in. w, 3-7/32 in. h; includes TB-806, C-829/31, R-865/69; CBIK No. 4266	V-807 grid

TABLE 8-3. STOCK NUMBER IDENTIFICATION

REF. DESIG.	STANDARD NAVY	AIR FORCE	REF. DESIG.	STANDARD NAVY	AIR FORCE
B-101	17-M-55256-5815	7700-572300-77542	C-137		3330-056200047
B-102	17-M-56801-1058	7700-572300-67472	C-138		3330-056200047
B-801	17-M-55256-5815	7700-572300-77542	C-139		3330-056200047
B-1301	N17-M-54348-8742	7700-572300-67426	C-140	N16-C-33627-7705	3330-376144060
B-1302		7700-572300-67428	C-141	N16-C-33627-7705	3330-376144060
B-1401	N17-M-54348-8742	7700-572300-67426	C-142		3330-056200047
B-1402	N17-M-54348-8742	7700-572300-67426	C-143	N16-C-33627-7705	3330-376144060
B-1501	N17-M-55693-7595	7700-572300-775276	C-144		3330-056200047
B-1701	17-M-55754-8050	7700-572300-77577	C-145	N16-C-33627-7705	3330-376144060
B-1702	17-M-57136-5585		C-146		3330-056200047
C-101	N16-C-16538-7801	3330-313430314	C-147		3330-056200047
C-102	N16-C-17082-7801	3330-314693017	C-148	N16-C-33627-7705	3330-376144060
C-103	N16-C-61142-1001	3330-313977575	C-149		3330-056200047
C-104	N16-C-30109-3791	3330-376034350	C-152	N16-C-30114-4276	3330-376034800
C-105	N16-C-33627-7705	3330-376144060	C-153A/C	N16-C-54467-1577	3330-056750089
C-106	N16-C-16081-6531	3330-313162524	C-155A/C	N16-C-54467-1577	3330-056750089
C-107	N16-C-29375-8076	3330-376016210	C-156	N16-C-33627-7705	3330-376144060
C-108	N16-C-29375-8076	3330-376016210	C-157A/C	N16-C-54467-1577	3330-056750089
C-109	N16-C-33627-7705	3330-376144060	C-158	N16-C-16081-6531	3330-313162524
C-110	N16-C-17073-3195	3330-055350159	C-159	N16-C-16273-6532	3330-313330364
C-111	N16-C-16081-6531	3330-313162524	C-160	N16-C-30114-4276	3330-376034800
C-112	N16-C-30114-4276	3330-376034800	C-161	N16-C-30114-4276	3330-376034800
C-113	N16-C-30114-4276	3330-376034800	C-162	N16-C-30114-4276	3330-376034800
C-114	N16-C-33627-7705	3330-376144060	C-164	N16-C-17073-3195	3330-055350159
C-115	N16-C-16529-6533	3330-313430288	C-165	N16-C-17073-3195	3330-055350159
C-116	16-C-54467-1566	3330-056750575	C-166	N16-C-33627-7705	3330-376144060
C-117	N16-C-15628-1344	3330-312860723	C-167	N16-C-17073-3195	3330-055350159
C-118	N16-C-33627-7705	3330-376144060	C-168	N16-C-16529-6533	3330-313430288
C-119	N16-C-33627-7705	3330-376144060	C-169	N16-C-16529-6533	3330-313430288
C-120A/D	16-C-63507-3751		C-170	N16-C-33627-7705	3330-376144060
C-121	N16-C-33627-7705	3330-376144060	C-171	N16-C-33627-7705	3330-376144060
C-125	N16-C-33627-7705	3330-376144060	C-172	N16-C-16789-1562	3330-313625839
C-126	16-C-66401-1014		C-173	N16-C-16401-6533	3330-313372192
C-126A	16-R-94402-1429		C-174	N16-C-16401-6533	3330-313372192
C-126B	16-S-83701-1003		C-175	N16-C-33627-7705	3330-376144060
C-128A/D	N16-C-63965-2800	3330-313286577	C-177		
C-129	N16-C-15628-1344	3330-312860723	C-178	N16-C-31090-4164	3330-376119600
C-130	N16-C-16529-6533	3330-313430288	C-179	N16-C-31090-4164	3330-376119600
C-132		3330-056200047	C-180	N16-C-31090-4164	3330-376119600
C-133		3330-056200047	C-181	N16-C-31090-4164	3330-376119600
C-134		3330-056200047	C-182	N16-C-31090-4164	3330-376119600
C-135		3330-056200047	C-183	N16-C-33627-7705	3330-376144060
C-136		3330-056200047	C-184	N16-C-33627-7705	3330-376144060

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
C-188	N16-C-16529-6533	3330-313430288
C-189	N16-C-16529-6533	3330-313430288
C-190	N16-C-16529-6533	3330-313430288
C-191	N16-C-16529-6533	3330-313430288
C-193A/C	N16-C-54467-1640	3330-317760168
C-194	N16-C-15916-1328	3330-313004860
C-195	N16-C-15916-1328	3330-313004860
C-198	N16-C-33627-7705	3330-376144060
C-199	N16-C-29718-7276	3330-376025600
C-200	N16-C-33627-7705	3330-376144060
C-201	N16-C-33627-7705	3330-376144060
C-202	N16-C-33623-3169	3330-376254800
C-203	N16-C-33623-3169	3330-376254800
C-204	N16-C-48841-9598	3330-056750579
	N16-M-60911-4456	
C-205	N16-C-45801-9615	3330-316777673
C-207A/C	N16-C-54467-1640	3330-317760168
C-210	N16-C-15532-1344	3330-312774209
C-211	N16-C-16529-6533	3330-313430288
C-230	N16-C-31913-4044	3330-376798520
C-231		3330-055350351
C-232	N16-C-17073-3195	3330-813889969
C-233	16-C-50333-3775	3330-0550350159
C-235	N16-C-33627-7705	3330-376144060
C-236	N16-C-33627-7705	3330-376144060
C-237	N16-C-33627-7705	3330-376144060
C-238	N16-C-33627-7705	3330-376144060
C-239	N16-C-33627-7705	3330-376144060
C-240		3330-056200047
C-241		3330-056200047
C-242		3330-056200047
C-243		3330-056200047
C-244	N16-C-16853-1562	3330-055350204
C-245	16-C-15761-6531	3330-055350359
C-246	N16-C-27577-1231	3330-313430310
C-247		3330-056200061
C-248		3330-056200061
C-249	N16-C-29713-6603	3330-314328094
C-250	N16-C-49221-9890	3330-317094986
C-251	N16-C-49221-9890	3330-317094986
C-253	N16-C-32651-9288	
C-254	N16-C-47321-9648	
C-301	N16-C-49981-9964	3330-056750277
C-302	N16-C-46371-9895	3330-318001249
C-303	N16-C-45801-9600	3330-317760098
C-304	N16-C-45801-9600	3330-317760098
C-305	N16-C-47321-9646	3330-319001022
C-306	N16-C-46371-9895	3330-318001249
C-307	N16-C-46371-9895	3330-318001249
C-308	N16-C-46371-9895	3330-318001249
C-309	N16-C-49981-9964	3330-056750277
C-310A/B	N16-C-34034-6295	
	N16-C-34324-7693	3330-376259401
C-311	N16-C-49981-9964	3330-056750277
C-312	N16-C-49981-9964	3330-056750277
C-313	N16-C-49981-9964	3330-056750277
C-314	N16-C-49981-9964	3330-056750277
C-316	N16-C-31090-4164	3330-376119600
C-318	N16-C-49981-9964	3330-056750277
C-319	16-C-49962-9135	3330-056750572
C-320	N16-C-44281-9613	3330-317704052
C-321	N16-C-44281-9613	3330-317704052
C-401	N16-C-45801-9615	3330-316777673
C-402	N16-C-49981-9993	3330-713643024
C-403	N16-C-49981-9993	3330-713643024
C-404	16-C-51897-7201	3330-059120002
C-405	N16-C-45801-9615	3330-316777673
C-406	N16-C-47321-9648	3330-319001024
C-407	N16-C-47321-9648	3330-319001024
C-408	N16-C-45801-9615	3330-316777673
C-501	N16-C-51897-8610	3330-056750071
C-502	N16-C-51897-8610	3330-056750071
C-503	N16-C-50717-5944	3330-056750581
C-504	N16-C-50717-5944	3330-056750581
C-505	N16-C-50717-5944	3330-056750581
C-506	N16-C-50717-5944	3330-056750581
C-507	N16-C-50717-5944	3330-056750581
C-508	N16-C-50717-5944	3330-056750581
C-509	N16-C-50717-5944	3330-056750581
C-510	N16-C-50717-5944	3330-056750581
C-511	N16-C-47300-7098	
C-512	N16-C-47321-9648	3330-319001024
C-516	N16-C-47321-9648	3330-319001024

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
C-517	N16-C-48841-9746	3330-316958340
	N16-M-60913-7709	3330-316958340
C-518	N16-C-48841-9598	3330-056750579
C-601	N16-C-49981-9964	3330-056750277
C-602	N16-C-49981-9964	3330-056750277
C-603	N16-C-47321-9646	3330-319001022
C-604	N16-C-46371-9896	3330-317094982
C-701	N16-C-48841-9420	3330-316958803
C-702	N16-C-48841-9420	3330-316958803
C-801	N16-C-33627-7705	3330-376144060
C-802	N16-C-45807-7617	3330-316770075
C-803	N16-C-33627-7705	3330-376144060
C-804	N16-C-33627-7705	3330-376144060
C-805A/E	16-C-63665-7070	
C-806	N16-C-64139-1181	3330-313420196
C-807	N16-C-30531-4284	3330-055950317
C-808	N16-C-64139-1181	3330-313420196
C-809	N16-C-33627-7705	3330-376144060
C-810	N16-C-33627-7705	3330-376144060
C-811	N16-C-33627-7705	3330-376144060
C-812	N16-C-33627-7705	3330-376144060
C-813	N16-C-64139-1181	3330-313420196
C-814	N16-C-31908-1564	3330-376128800
C-815	N16-C-33627-7705	3330-376144060
C-816	N16-C-33627-7705	3330-376144060
C-817	N16-C-33627-7705	3330-376144060
C-818	N16-C-33627-7705	3330-376144060
C-819	N16-C-64139-1181	3330-313420196
C-820	N16-C-33627-7705	3330-376144060
C-821	N16-C-33627-7705	3330-376144060
C-822	N16-C-33627-7705	3330-376144060
C-823	N16-C-47321-9648	3330-319001024
C-824	N16-C-33627-7705	3330-376144060
C-825	N16-C-33627-7705	3330-376144060
C-826	N16-C-33627-7705	3330-376144060
C-827	N16-C-48841-9420	3330-316958803
C-828	16-C-50333-3775	
C-829	N16-C-31913-4044	3330-055950016
C-830	N16-C-31913-4044	3330-055950016
C-831	N16-C-31913-4044	3330-055950016
C-832	N16-C-31095-6644	3330-376120000
C-833		3330-056200061
C-834		3330-056200648
C-835		3330-055950106
C-836		
C-837		3330-056200047
C-838	N16-C-29713-6603	3330-314328094
C-839	N16-C-29713-6603	3330-314328094
C-840	N16-C-30188-3727	3330-056200649
C-841	N16-C-30188-3727	3330-056200649
C-842	N16-C-30188-3727	3330-056200649
C-843	N16-C-30188-3727	3330-056200649
C-844	16-C-58716-3970	
C-845	16-C-58716-3970	
C-846	16-C-58716-3970	
C-847	16-C-58716-3970	
C-848	N16-C-32651-9288	
C-849	N16-C-33627-7705	3330-376144060
C-850	N16-C-32651-9288	
C-851	N16-C-28558-1676	3330-313862000
C-852	N16-C-33627-7705	3330-376144060
C-853	N16-C-33627-7705	3330-376144060
C-854	N16-C-33627-7705	3330-376144060
C-855	N16-C-47321-9650	3330-319001237
C-856	N16-C-45801-9615	3330-316777673
C-857	N16-C-48841-9598	3330-056750579
	N16-M-60911-4456	
C-858	N16-C-45807-7617	3330-316777075
C-859	16-C-58716-3970	
C-860		3330-056200654
C-861	N16-C-60282-1536	3330-058100183
C-862	N16-C-33627-7705	3330-376144060
C-867	N16-C-33627-7705	3330-376144060
C-868	N16-C-49221-9890	3330-317094986
C-869	N16-C-49221-9890	3330-317094986
C-901	N16-C-64139-1181	3330-313420196
C-902	N16-C-64139-1181	3330-313420196
C-903	N16-C-64139-1181	3330-313420196
C-904	N16-C-64139-1181	3330-313420196
C-905	N16-C-64139-1181	3330-313420196
C-906	N16-C-64139-1181	3330-313420196
C-907	N16-C-64139-1181	3330-313420196
C-908	N16-C-64139-1181	3330-313420196
C-909	N16-C-64139-1181	3330-313420196
C-910	N16-C-64139-1181	3330-313420196
C-912		3330-056200047

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
C-914	N16-C-33622-5222	3330-376144024
C-915	N16-C-31090-4164	3330-376119600
C-916	N16-C-44281-9613	3330-056750572
	N16-M-61148-1050	3330-317704052
C-918	N16-C-33622-5222	3330-376144024
C-919	N16-C-32646-6808	3330-376150800
C-920	N16-C-48841-9420	3330-316958803
C-921	N16-C-48841-9420	3330-316958803
C-1001	N16-C-51881-9092	3330-317440994
C-1002	N16-C-51881-9092	3330-317440994
C-1003	N16-C-49981-9964	3330-056750277
C-1004	N16-C-49981-9964	3330-056750277
C-1005	N16-C-49981-9964	3330-056750277
C-1006	N16-C-45801-9615	3330-316777673
C-1007	N16-C-45801-9615	3330-316777673
C-1008	N16-C-45801-9615	3330-316777673
C-1101	N16-C-30119-6756	3330-376035200
C-1102	N16-C-33627-7705	3330-376144060
C-1103	N16-C-33627-7705	3330-376144060
C-1104	N16-C-31095-6688	3330-376143494
C-1105	16-C-58156-2014	3330-058050004
C-1106	16-C-61549-7110	
C-1107	N16-C-33622-7756	3330-056200773
C-1108	N16-C-32256-3244	
C-1109	N16-C-33622-7756	3330-056200773
C-1110	N16-C-33622-7756	3330-056200773
C-1111		3330-376144060
C-1112	N16-C-33622-7756	3330-056200773
C-1113	N16-C-33622-7756	3330-056200773
C-1114	16-C-58156-2014	3330-058050004
C-1115	N16-C-29381-1556	3330-376016600
C-1116	N16-C-33622-7756	3330-056200773
C-1117	N16-C-33622-7756	3330-056200773
C-1118	N16-C-33622-7756	3330-056200773
C-1119		3330-056200773
C-1120	16-C-58156-2014	3330-05805004
C-1121	16-P-401281-185	
C-1121A	17-I-64066-7036	
C-1122	N16-C-33622-7756	3330-056200773
C-1123	N16-C-33622-7756	3330-056200773
C-1124	16-C-27995-2357	3330-055950375
C-1125	N16-C-33627-7705	3330-376144060
C-1126	N16-C-33627-7705	3330-376144060
C-1127	N16-C-32646-6808	3330-376150800
C-1128	16-P-401281-184	
C-1129	N16-C-48841-9420	3330-316958803
C-1130	N16-C-45801-9615	3330-316777673
C-1136	N16-C-33622-7756	3330-056200773
C-1137	N16-C-33622-7756	3330-056200773
C-1138	N16-C-33622-7756	3330-056200773
C-1139	N16-C-33622-7756	3330-056200773
C-1140	16-C-61549-7110	
C-1141	16-C-61549-7110	
C-1301	16-C-61549-7110	
C-1302		
C-1302A		
C-1303		3330-055950386
C-1304		3330-055950386
C-1305A/E		
C-1306		3330-055950386
C-1307	16-C-65875-1841	
C-1308	N16-C-31510-2526	3330-055950377
C-1309	16-C-31096-8592	
C-1310	16-C-31095-6683	3330-055950374
C-1311	N16-C-31095-6683	3330-055950374
C-1312	N16-C-31095-6683	3330-055950374
C-1313	N16-C-31095-6683	3330-055950374
C-1314	N16-C-31095-6683	3330-055950374
C-1315	N16-C-31095-6683	3330-055950374
C-1316	N16-C-31095-6683	3330-055950374
C-1317	N16-C-31095-6683	3330-055950374
C-1318	N16-C-31095-6683	3330-055950374
C-1319	16-C-20018-2792	3330-055600174
C-1320	16-C-60036-1722	
C-1321	N16-C-31095-6683	3330-055950374
C-1401	16-C-65875-1841	
C-1402	16-C-56821-6281	3330-058000006
C-1403	16-C-56821-6281	3330-058000006
C-1404	16-C-56821-6281	3330-058000006
C-1405	N16-C-31087-5151	3330-376564770
C-1406	16-C-63137-6580	
C-1407	16-C-60813-5276	
C-1408	16-C-20018-2792	3330-055600174
C-1409	16-C-20018-2792	3330-055600174
C-1502	16-C-51881-9598	
C-1601	16-C-56020-8076	

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
C-1602	16-C-56020-8076	
CB-501	17-C-51510-8001	
CR-301		
CR-501	17-R-51202-3961	
CR-1301	17-R-51474-2002	
CR-1401	N17-R-51474-2002	
CR-1402	N17-R-51474-2002	
E-109	17-T-28218-3901	
E-110	N17-T-28244-2475	8880-880000-2045
E-111	16-C-96177-3001	
E-111A		
E-112	N16-S-34532-8725	3370-774000-2165
thru		
E-119		
E-120	N16-S-34520-3862	3370-774000-1935
thru		
E-129		
E-130	N16-S-34557-8351	3370-774000-1955
thru		
E-134		
E-135	N16-S-34576-6513	
thru		
E-139		
E-501	N17-T-28218-4116	3320-082740130
thru		
E-503		
E-504	17-I-68769-9021	3320-082740660
thru		
E-506		
E-507A	N17-I-48407-8821	3320-081500170
thru		
E-510A		
E-507B	N17-I-47380-8601	
thru		
E-510B		
E-511	17-I-68769-9021	3320-082740660
thru		
E-517		
E-524	N17-T-28218-4116	3320-082740130
thru		
E-529		
E-541	N17-T-28218-4116	3320-082740130
E-566	N17-T-28244-2475	8880-880000-2045
E-567	N17-T-28244-2475	8880-880000-2045
E-568	N17-I-64210-9526	3320-333731401
thru		
E-591		
E-592	N16-S-34557-8351	
E-593	N16-S-34607-6039	3370-774000-1955
thru		3370-774000-1527
E-597		
E-598	N17-T-28218-4116	3320-082740130
E-599	N17-T-28218-4116	3320-082740130
E-701		
E-702		
E-801		
thru		
E-811		
E-812	N17-T-28244-2475	8880-880000-2045
thru		
E-815		
E-868	N16-S-63515-4151	8850-889946
E-876	N17-T-28244-2475	8880-880000-2045
E-877	N17-T-28244-2475	8880-880000-2045
E-878		
E-879		
E-880	17-I-69154-6200	
thru		
E-883		
E-884	N16-S-34532-8725	3370-774000-2165
E-885	N16-S-34520-3862	3370-774000-1935
thru		
E-888		
E-889	N16-S-34557-8351	3370-774000-1955
thru		
E-893		
E-894	N16-S-34576-6513	3370-774000-2175
E-895	17-O-75010-5050	
E-901	17-I-69154-6200	
thru		
E-908		
E-909	17-I-48972-9807	
thru		
E-912		
E-914	16-C-95445-3676	1760-048242001
E-916	N16-S-34520-3862	3370-774000-1935
E-1001	N16-S-34557-8351	3370-774000-1955
E-1002	N16-S-34557-8351	3370-774000-1955
E-1003	N16-S-34607-6039	3370-774000-1527

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
E-1004	N16-S-34607-6039	3370-774000-1527
E-1201	N16-S-34607-6039	3370-774000-1527
E-1202	N16-S-34576-6513	3370-774000-2175
E-1203	N16-S-34576-6513	3370-774000-2175
E-1204	N16-S-34576-6513	3370-774000-2175
E-1301	17-I-69215-9481	
E-1302	17-I-69215-9481	
E-1303	17-I-69215-9481	
E-1304	17-I-69215-9481	
E-1305	N17-I-64210-9526	3320-333731401
E-1310	N17-T-28228-3181	
E-1401	N17-I-69231-9541	3320-333731831
E-1402	N17-I-69231-9541	3320-333731831
E-1403	N17-I-69231-9541	3320-333731831
E-1404	N17-I-69231-9541	3320-333731831
E-1405	N17-I-64210-9526	3320-333731401
E-1406	N17-I-69213-9485	
E-1407	N17-I-69213-9485	
E-1408	N17-I-69213-9485	
E-1409	N17-I-69213-9485	
E-1501A	N17-D-401761-101	
E-1501B	N17-D-401761-101	
E-1501C	N17-D-401761-101	
E-1502A	17-E-27081-1667	
E-1502B	17-E-27081-1667	
E-1701 thru E-1703	N17-I-59656-1301	
F-101	N17-F-16320-255	8870-212000-638
F-102	G17-F-16302-120	8870-112000-822
F-301	G17-F-16302-120	8870-112000-822
F-302	G17-F-16302-140	8870-112000-869
F-401	G17-F-16302-120	8870-112000-822
F-501	G17-F-16302-120	8870-112000-822
F-502	G17-F-16302-120	8870-112000-822
F-503	N17-F-14327-30	8870-112000-872
F-504	N17-F-14327-30	8870-112000-872
F-505	G17-F-16302-140	8870-112000-869
F-506	N17-F-14327-30	8870-112000-872
F-507	N17-F-14327-30	8870-112000-872
F-508	N17-F-14327-30	8870-112000-872
F-509	N17-F-14327-30	8870-112000-872
F-510	N17-F-14327-30	8870-112000-872
F-511	G17-F-16302-140	8870-112000-869
F-512	G17-F-16302-140	8870-112000-869
F-513	N17-F-14327-30	8870-112000-872
F-514	N17-F-14327-30	8870-112000-872
F-515	G17-F-16302-140	8870-112000-869
F-516	G17-F-16302-140	8870-112000-869
F-801	N17-F-16320-255	8870-212000-638
F-802	G17-F-16302-120	8870-112000-822
F-901	G17-F-16302-120	8870-112000-822
F-1001	G17-F-16302-120	8870-112000-822
F-1002	G17-F-16302-120	8870-112000-822
F-1101	G17-F-16302-120	8870-112000-822
F-1102	G17-F-16302-120	8870-112000-822
F-1301	G17-F-16302-140	8870-112000-869
HR-801	17-H-60018-3745	
HR-901	17-H-60003-7205	
HS-401	17-T-20651-1001	
HS-401A	N17-H-020001-1021	
HS-401B	N17-C-202210-0801	
HS-401C		
HS-401D		
HS-401E	N17-T-89553-2276	
HS-401F		
HS-401G		
HS-401H		
I-101		7700-535058-223
I-101A	G17-L-6806-130	
I-101B		
I-102	N17-L-76902-2559	
I-102A	G17-L-6806-130	
I-102B	N17-L-250856-776	
I-103	N17-L-76866-8341	7700-549140
I-103A	G17-L-6806-130	
I-103B	N17-L-250653-521	
I-104	N17-L-250949-235	7700-527253-84
I-104A	G17-L-6297	
I-105	N17-L-250949-235	
I-105A	G17-L-6297	
I-106	N17-L-250949-235	
I-106A	G17-L-6297	
I-401		7700-549140
I-401A	G17-L-6806-130	
I-401B		

REF. DESIG.	STANDARD NAVY	AIR FORCE
I-501	N17-L-76751-6470	
I-501A	N17-L-2940-230	
I-501B		
I-502	N17-L-76882-7823	
I-502A	N17-L-2940-230	
I-502B		
I-503	N17-L-76801-5473	
I-503A	N17-L-2940-230	
I-503B	N17-L-250389-725	
I-504	N17-L-76940-3518	
I-504A	N17-L-2940-230	
I-504B		
I-801	N17-L-76689-4666	
I-801A	G17-L-6806-130	
I-801B		
I-802	N17-L-76866-8341	7700-549140
I-802A	G17-L-6806-130	
I-802B	N17-L-250653-521	
I-803	N17-L-250949-235	
I-803A	G17-L-6297	
I-901	N17-L-76902-2630	7700-535025
I-901A	G17-L-6297	
I-901B	N17-L-250856-776	
I-902	N17-L-76902-2630	7700-535025
I-902A	N17-L-6505-500	
I-902B	N17-L-250856-776	
I-1001		
I-1001A	G17-L-6806-130	
I-1001B		
J-101	N17-C-73574-8919	8850-580240
J-102	N17-C-73595-5293	8850-586330
J-103		
J-104	N17-C-71207-5650	
J-105		
J-106	N17-C-73108-1262	8850-654440
J-107	N17-C-73108-1262	8850-654440
J-108	N17-C-71108-5314	8850-454550
J-109	N17-J-39233-7090	
J-110		
J-111	N17-J-39233-7090	
J-301	N17-C-73629-7175	8850-604724
J-302	N17-C-73542-5310	8850-562540
J-303	N17-C-73224-1604	8850-554576
J-304	N17-J-39435-6234	
J-305	N17-C-73595-5293	8850-586330
J-306	N17-C-73515-8322	8850-554576
J-307	N17-C-73124-6696	8850-493500
J-308	N17-C-73124-6696	8850-493500
J-309		
J-310		
J-401	N17-J-39435-6234	
J-402	N17-J-39435-6234	
J-403		
J-501 thru J-504	N17-C-73124-6696	8850-493500
J-601	N17-C-73574-8919	8850-580240
J-602	17-C-73639-4250	
J-701	17-C-73606-9189	
J-702	N17-C-73595-5293	8850-586330
J-703 thru J-707	N17-C-73108-1262	8850-654440
J-708	N17-C-73574-8919	8850-580240
J-709	N17-C-73291-4410	8850-493500
J-801	N17-C-73595-5293	8850-586330
J-802	17-C-73606-9189	
J-803	N17-C-73108-1267	8850-654218
J-804	N17-C-73108-1262	8850-654440
J-805		
J-806	N17-C-73480-2345	8850-530900
J-807		
J-901	N17-C-73542-5310	8850-562540
J-902	N17-C-73574-8919	8850-580240
J-903	N17-C-73108-1262	8850-654440
J-904	N17-C-73184-9201	
J-1001	N17-C-73515-8322	8850-554576
J-1002	N17-C-73291-4410	8850-493500
J-1101	N17-C-73574-8919	8850-580240
J-1102	N17-C-73629-7175	8850-604724
J-1103	N17-C-73108-1262	8850-654440
J-1301	N17-C-73595-5293	8850-586330
J-1302	17-C-73639-4250	
J-1303		
J-1304	N17-C-73124-6696	8850-493500
J-1305	N17-C-73124-6696	8850-493500

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
J-1401	17-C-73606-9189	
J-1501	N17-C-73124-6696	8850-493500
K-101		
K-102	17-R-65355-5896	
K-301		
K-302	17-R-65355-5896	
K-401		
K-501	17-R-65356-2171	
K-502		
K-503		
K-504	N17-T-45201-5901	3380-575025-2675
K-505		
K-506	17-R-64562-1978	
K-507	17-R-64658-4545	
K-508	17-R-65355-7741	
K-509	17-R-65341-5686	
K-510	17-R-65351-3457	
K-601	17-R-65355-9482	
K-602	17-R-65355-7741	
K-603	17-R-65356-2349	
K-604		
K-605		
K-606		
K-607		
K-608	17-R-65355-7741	
K-609	17-R-65356-2338	
K-610	17-R-65355-7741	
K-611		
K-612		
K-703		
K-801	17-R-65355-5896	
K-901	17-R-65355-5896	
K-1301	17-R-65355-7741	
K-1302	17-R-65330-2550	
K-1401	17-R-65330-2550	
K-1402	17-R-65330-2550	
K-1501	17-R-65343-9289	
L-101	16-C-75093-3052	
L-102	N16-C-74667-8611	
L-103	16-C-75093-3052	
L-301		
L-302	N16-C-74667-8611	
L-501	16-R-28996-2480	
L-502	16-R-29060-3325	
L-503	16-R-29060-3325	
L-504	16-R-29060-2201	
L-505	16-R-29060-2201	
L-601	16-R-28990-9086	
L-801	N16-C-74667-8611	
L-804		
L-807		
L-808	N16-C-74667-8611	
L-809	16-C-74331-4664	
L-810	N16-C-74667-8611	
L-811		
L-812	N16-C-74667-8611	
L-815		
L-816		
L-817		
L-818	16-C-73735-8548	
L-819	16-C-73735-8548	
L-901	N16-C-74667-8611	
L-902	N16-C-74667-8611	
L-903	16-C-73451-2091	
L-904	16-C-73451-2091	
L-1101	16-C-76501-7506	
L-1102	16-C-76423-2300	
L-1103	16-C-76443-8506	
L-1104		
L-1105	16-C-76423-4937	
L-1106	16-C-76275-9417	
L-1107	16-C-76328-1537	
L-1108	N16-C-74667-8611	
L-1109		
L-1110	16-C-76443-9882	
L-1111	16-C-76415-5662	
L-1112	16-C-76297-3806	
L-1113	16-C-76236-1250	
L-1114	16-C-76219-2002	
L-1115	N16-C-73509-2812	
L-1116	N16-C-74667-8611	
L-1117		
L-1118		
L-1119		
L-1120		
L-1301	N16-C-73509-2812	

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
L-1302		
L-1303	16-C-76349-5224	
L-1304		
L-1305		
L-1306		
L-1307		
L-1308		
L-1309		
L-1310		
L-1311	N16-C-73509-2812	
L-1312	16-C-72711-2280	
L-1313		
L-1314		
L-1401		
L-1402		
L-1403		
M-401	17-M-22711-7185	
M-402	17-M-21878-3101	
M-801	17-M-19398-1731	0809-MR25W005DCMA
M-901	17-M-19461-8071	
M-1001	N17-M-35571-6251	0809-MR35W300DCVV
M-1101	N17-M-19461-6701	0809-MR35W010DCMA
M-1501	17-M-26659-1001	
M-1502	N17-M-35878-6476	0809-MR35W005DCKV
M-1503	N17-M-19316-6981	0809-MR35W002DCMA
M-1504	17-M-33890-2801	
M-1701	N17-M-19751-6656	0809-MR35W200DCMA
M-1702	N17-M-19751-6656	0809-MR35W200DCMA
M-1703	N17-M-19925-6651	0809-MR35W800DCMA
M-1704	N17-M-19316-6981	0809-MR35W002DCMA
N-101	16-S-117102-109	1760-046663756
N-102	16-S-117102-106	1760-046663752
N-103	16-S-117102-105	1760-046663751
N-104	16-S-117102-108	1760-046663754
N-105	16-S-117102-107	1760-046663753
N-801	16-S-117102-110	1760-046663755
N-1101	16-S-117101-998	
N-1301	16-S-117101-999	
N-1302	16-S-117102-101	
N-1401	16-S-117102-102	
N-1402	16-S-117102-104	
N-1403	16-S-117102-103	
O-101		
O-102		
O-103		
O-105	N16-G-431616-317	6560-427000-386
O-106	16-G-432216-801	1760-047251000
O-106A	16-G-432216-801	1760-047251000
O-107		
O-108	16-W-900001-274	1600-291624260
O-109	16-D-901161-213	1760-046711053
O-110	16-D-901161-212	1760-046711051
O-110A	16-D-901161-212	
O-111	16-T-43276-1174	
O-112	42-C-16475-27	
O-113	42-S-18193-760	
O-114	42-S-18193-795	
O-115	GM-3110-155-9601	
O-116		
O-117		
O-117A		
O-118	16-W-900001-275	1600-291624261
O-118A	16-W-900001-275	1600-291624261
O-119	16-W-900001-276	
O-120	42-L-7013-20	
O-121		
O-122		
O-123		
O-124		
O-125		
O-309	N16-C-289001-101	1760-287140150
O-310	N16-C-289001-101	1760-287140150
O-311	N16-K-700314-661	
O-312	N16-K-700314-661	
O-313	N16-K-700314-661	
O-408	N16-K-700314-525	
O-501		
O-508		
thru		
O-511		
O-701		
O-702		
thru		
O-711		
O-712		
O-801	N16-K-700314-661	
O-802	N16-K-700314-661	
O-803	N16-K-700314-525	

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
O-804	N16-K-700362-211	
O-807		
O-808	16-D-901161-213	
O-809	16-T-43276-1174	
O-810	16-W-900001-276	
O-811	42-S-18193-735	
O-812	42-S-18193-755	
O-814	16-W-900001-274	
O-815		
O-816	42-C-16475-27	
O-817	42-L-7013-20	
O-818	N16-G-431616-317	6560-427000-386
O-819		
O-820		
O-904		
O-1001	N16-K-700314-661	
O-1106	N16-K-700314-661	
O-1109	17-S-69571-2645	
O-1109A	16-T-43276-1171	
O-1110	GM-3110-159-9105	
O-1111	GM-3110-278-6798	
O-1112	16-D-901161-211	
O-1114	16-T-43276-1175	
O-1115	16-T-43276-1173	1760-047878000
O-1116	N16-W-900001-134	1600-291624263
O-1117	16-W-900001-274	1600-291624260
O-1118	N16-W-900001-116	
O-1119	60-G-28676-8397	
O-1120		
O-1301 thru O-1320	N16-K-701357-493	
O-1321	N16-C-289001-101	1760-287140150
O-1322	N16-C-289001-101	1760-287140150
O-1323	16-D-901161-215	1760-046711054
O-1325	60-G-28676-8397	
O-1326	GM-3110-155-9639	3400-412090
O-1327	16-G-433445-101	1760-047251005
O-1328		
O-1330	N16-W-900001-116	
O-1330A	N16-W-900001-116	
O-1331	16-T-43276-1173	1760-047878000
O-1332	16-D-901161-214	1760-406711052
O-1333	16-D-901161-211	
O-1334	22-W-7196-1500	
O-1335		
O-1336		
O-1337		
O-1401		
O-1402 thru O-1411	N16-K-701537-493	
O-1413	16-T-43276-1172	1760-048976000
O-1414	16-D-901161-210	1760-046711055
O-1415	GM-3110-155-9639	3400-412090
O-1416	GM-3110-155-8416	
O-1417	16-G-423519-101	1760-047250102
O-1418	R-3110-157-1972	
O-1419	16-G-431290-550	
O-1420	N16-W-900001-116	
O-1421	60-G-28676-8397	
O-1422	16-G-402606-621	
O-1423	16-G-402606-620	6560-427000-3454
O-1424	16-G-402246-997	1760-047232562
O-1425	16-G-402247-100	1760-047232563
O-1426	16-D-901161-214	
O-1427	16-D-901161-211	
O-1427A	16-D-901161-211	
O-1428	22-W-7196-1500	
O-1429		
O-1430		
O-1431		
O-1501		
O-1502	17-I-19011-2905	
O-1503		
O-1505		
O-1506		
O-1507		
O-1525		
O-1701	17-I-19011-2576	
O-1702	42-C-22387-3725	
O-1703	42-C-22387-3925	
O-1704		
O-1705		
O-1707		

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
O-1708		
O-1709		
O-1728		
P-101	N17-C-71291-5118	8850-345479
P-102	N17-C-71307-5001	8850-354120
P-103		
P-104		
P-105		
P-107	N17-C-71408-5333	
P-108	N17-C-71408-5333	
P-109	N17-C-71190-6437	
P-110	N17-C-71190-6437	
P-301	N17-C-71331-7730	
P-302	N17-C-71255-2387	
P-303	N17-C-71515-8115	8850-300840
P-305	N17-C-71307-5001	8850-354120
P-306	N17-C-71224-1370	8850-300240
P-601	N17-C-71291-5118	8850-345479
P-602	17-C-71336-9981	
P-701	N17-C-71317-6091	8850-364000
P-702	N17-C-71307-5001	8850-354120
P-703 thru P-707	N17-C-71408-5333	
P-708	N17-C-71291-5118	8850-345479
P-709	N17-C-71575-1008	8850-345426
P-801	N17-C-71307-5001	8850-354120
P-802	N17-C-71317-6091	8850-364000
P-803	N17-C-71408-5333	
P-804	N17-C-71408-5333	
P-805		
P-806	N17-C-71185-1214	8850-271605
P-807		
P-901	N17-C-71255-2387	
P-902	N17-C-71291-5118	8850-345479
P-903	N17-C-71408-5333	
P-904		
P-1001	N17-C-71224-1370	8850-300240
P-1002	N17-C-71575-1008	8850-345426
P-1101	N17-C-71291-5118	8850-345479
P-1102	N17-C-71331-7730	
P-1103	N17-C-71408-5333	
P-1301	N17-C-71307-5001	8850-354120
P-1302	17-C-71336-9981	
P-1303		
P-1401	N17-C-71317-6091	8850-364000
P-1501	N17-C-71427-6126	8850-218020
R-102	N16-R-50011-431	3350-098000-3651
R-103	N16-R-50480-811	3350-098000-5131
R-104	N16-R-49625-811	3350-098000-2431
R-105	N16-R-50633-811	3350-098000-5451
R-106	N16-R-50480-811	3350-098000-5131
R-107	N16-R-50309-811	3350-098000-4791
R-108	N16-R-50399-811	3350-098000-4791
R-109	N16-R-50480-811	3350-098000-5131
R-110	N16-R-50282-811	3350-098000-4391
R-111	N16-R-50417-811	
R-112	N16-R-50417-811	3350-447000-1967
R-113	N16-R-50282-811	3350-098000-4391
R-114	N16-R-50480-811	3350-098000-5131
R-115	N16-R-50399-811	3350-098000-4791
R-116	N16-R-50399-811	3350-098000-4791
R-117	N16-R-50480-811	3350-098000-5131
R-118	N16-R-50282-811	3350-098000-4391
R-119	N16-R-50417-811	3350-447000-1967
R-120	N16-R-50417-811	3350-447000-1967
R-121	N16-R-50282-811	3350-098000-4391
R-122	N16-R-50480-811	3350-098000-5131
R-123	N16-R-50480-811	3350-098000-5131
R-124	N16-R-49580-811	3350-098000-2271
R-125	N16-R-50588-811	3350-098000-5371
R-126	N16-R-50552-811	3350-098000-5291
R-128	N16-R-50552-811	3350-098000-5291
R-129	N16-R-50444-811	3350-098000-4951
R-130	N16-R-50418-231	3350-128000-5475
R-134	N16-R-50633-811	3350-098000-5451
R-136	N16-R-50416-751	3350-128000-5475
R-137	N16-R-50444-811	3350-098000-4951
R-138	N16-R-50822-811	3350-098000-6191
R-139	N16-R-50633-811	3350-098000-5451
R-140	N16-R-49625-811	3350-098000-2431
R-142	N16-R-50310-480	3350-146000-4477
R-143	N16-R-49625-811	3350-098000-2431
R-145	N16-R-50337-528	3350-146000-4557
R-146	N16-R-49427-811	3350-098000-1161

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
R-147	N16-R-49625-811	3350-098000-2431
R-149	N16-R-50337-528	3350-146000-4557
R-150	N16-R-49625-811	3350-098000-2431
R-152	N16-R-50337-528	3350-146000-4557
R-153	N16-R-50552-811	3350-098000-5291
R-154	N16-R-49427-811	3350-098000-1161
R-155	N16-R-50975-811	3350-098000-6511
R-156	N16-R-49661-811	3350-098000-2591
R-157	N16-R-50444-811	3350-098000-4951
R-158	N16-R-50166-231	3350-128000-4655
R-159	N16-R-50822-811	3350-098000-6191
R-161	N16-R-50759-811	3350-098000-5931
R-162	N16-R-50372-811	3350-098000-4711
R-163	N16-R-50633-811	3350-098000-5451
R-164	N16-R-49806-726	3350-146000-2997
R-165	N16-R-91340-5980	3350-851500-6522
R-166	N16-R-50200-751	3350-128000-4735
R-167	N16-R-49923-531	3350-098000-3331
R-168	N16-R-49922-811	3350-128000-3835
R-169	N16-R-50129-811	3350-098000-3931
R-170	N16-R-50480-811	3350-098000-5131
R-171	N16-R-50399-811	3350-098000-4791
R-172	N16-R-50399-811	3350-098000-4791
R-173	N16-R-49806-726	3350-146000-2997
R-174	N16-R-50282-811	3350-098000-4391
R-175	N16-R-50588-811	3350-098000-5371
R-176	N16-R-50417-811	3350-447000-1967
R-177	N16-R-50282-811	3350-098000-4391
R-179	N16-R-50354-811	
R-180	N16-R-50399-811	3350-098000-4791
R-181	N16-R-50480-811	3350-098000-5131
R-182	N16-R-50282-811	3350-098000-4391
R-183	N16-R-50237-811	3350-098000-4311
R-184	N16-R-50417-811	3350-447000-1967
R-185	N16-R-50282-811	3350-098000-4391
R-186	N16-R-50480-811	3350-098000-5131
R-187	N16-R-49842-231	3350-098000-3675
R-188	N16-R-50237-811	3350-098000-4311
R-190	N16-R-50480-811	3350-098000-5131
R-191	N16-R-50282-811	3350-098000-4391
R-192	N16-R-50354-811	
R-193	N16-R-50417-811	3350-447000-1967
R-194	N16-R-50282-811	3350-098000-4391
R-195	N16-R-50480-811	3350-098000-5131
R-196	N16-R-50400-231	3350-128000-5395
R-197	N16-R-49769-811	3350-098000-2911
R-201	N16-R-50822-811	3350-098000-6191
R-202	N16-R-50822-811	3350-098000-6191
R-203	N16-R-50822-811	3350-098000-6191
R-204	N16-R-50822-811	3350-098000-6191
R-205	N16-R-50678-811	3350-098000-5611
R-206	N16-R-50678-811	3350-098000-5611
R-207	N16-R-49940-811	3350-098000-3411
R-208	N16-R-49940-811	3350-098000-3411
R-209	N16-R-50822-811	3350-098000-6191
R-210	N16-R-50822-811	3350-098000-6191
R-211	N16-R-50822-811	3350-098000-6191
R-212	N16-R-50633-811	3350-098000-5451
R-213	N16-R-50633-811	3350-098000-5451
R-214	N16-R-50633-811	3350-098000-5451
R-215	N16-R-50633-811	3350-098000-5451
R-216	N16-R-50633-811	3350-098000-5451
R-218	N16-R-50633-811	3350-098000-5451
R-219	N16-R-50633-811	3350-098000-5451
R-222	N16-R-49661-811	3350-098000-2591
R-223	N16-R-50416-751	3350-128000-5475
R-224	N16-R-50372-346	3350-146000-4717
R-225	N16-R-50975-811	3350-098000-6511
R-226	N16-R-50012-811	3350-098000-3651
R-227	N16-R-49661-811	3350-098000-2591
R-229	N16-R-50129-811	3350-098000-3931
R-230	N16-R-50633-811	3350-098000-5451
R-231	N16-R-50012-811	3350-098000-3651
R-232	N16-R-50552-811	3350-098000-5291
R-243	N16-R-49427-811	3350-098000-1161
R-244	N16-R-50011-431	3350-098000-3651
R-245	N16-R-50588-811	3350-098000-5371
R-246	N16-R-49806-726	3350-146000-2997
R-247	N16-R-50400-231	3350-128000-5395
R-248	N16-R-50480-811	3350-098000-5131
R-249	N16-R-50515-431	3350-098000-5211
R-250	N16-R-50399-811	3350-098000-4791
R-251	N16-R-50480-811	3350-098000-5131
R-252	N16-R-50633-811	3350-098000-5451
R-253	N16-R-49769-811	3350-098000-2911
R-254	N16-R-50822-811	3350-098000-6191

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
R-255	N16-R-50633-811	3350-098000-5451
R-256	N16-R-66085-6431	3350-527000-4965
R-257	N16-R-66085-6431	3350-527000-4965
R-258	N16-R-66030-3886	3350-527000-4845
R-259	N16-R-50517-231	
R-260	N16-R-49427-811	
R-261	N16-R-49940-811	3350-098000-3411
R-301	16-R-50147-112	3350-146000-4117
R-302	16-R-50147-112	3350-146000-4117
R-303	N16-R-49994-138	3350-146000-3617
R-304	N16-R-49923-551	3350-146000-3337
R-305	N16-R-50481-726	3350-146000-5137
R-306	N16-R-49778-236	3350-146000-2957
R-307	N16-R-50283-726	3350-146000-4397
R-308	N16-R-50283-726	3350-146000-4397
R-309	N16-R-50461-940	3350-146000-4997
R-310	N16-R-50408-130	3350-146000-4837
R-311		
R-312	N16-R-50481-726	3350-146000-5137
R-313	N16-R-50481-726	3350-146000-5137
R-314		3350-146000-5137
R-315	N16-R-50408-130	3350-146000-4837
R-316	N16-R-50461-940	3350-146000-4997
R-317	N16-R-50634-726	
R-318	N16-R-49923-551	3350-146000-3337
R-319	16-R-50147-112	3350-146000-4117
R-320	N16-R-51174-726	3350-146000-7257
R-321		
R-322		
R-323	16-R-66168-1985	3350-537000-2726
R-324A/B	16-R-89047-6117	
R-325	N16-R-88009-4056	3350-793000-3863
R-326A/B	16-R-89047-6117	
R-328	N16-R-50094-491	3350-146000-3897
R-330	N16-R-50373-231	3350-128000-4717
R-331	N16-R-50373-231	3350-128000-4717
R-332	N16-R-50517-231	3350-128000-7515
R-333	16-R-66141-2416	3350-537000-2721
R-334	N16-R-50634-231	3350-128000-5955
R-335	N16-R-50634-231	3350-128000-5955
R-336	N16-R-50634-231	3350-128000-5955
R-337	N16-R-50634-231	3350-128000-5955
R-338	N16-R-89957-1980	3350-858000-1941
R-339	N16-R-91291-4935	3350-844500-6311
R-340	16-R-78420-3499	
R-341	N16-R-50066-811	3350-098000-3811
R-342	N16-R-50066-811	3350-098000-3811
R-343	N16-R-50418-231	3350-128000-5475
R-344	N16-R-50418-231	3350-128000-5475
R-345	N16-R-50697-726	3350-146000-5697
R-346	N16-R-50697-726	3350-146000-5697
R-347	N16-R-50283-726	3350-146000-4397
R-348	N16-R-49428-231	3350-128000-2455
R-349	N16-R-50634-231	3350-128000-5955
R-401		
R-402		
R-403		
R-404	N16-R-50715-231	3350-128000-6415
R-405	N16-R-50418-231	3350-128000-5475
R-406		3350-146000-3817
R-407	N16-R-50760-231	3350-128000-6535
R-408	N16-R-50517-231	3350-128000-7515
R-409	N16-R-50715-231	3350-128000-6415
R-410	16-R-50139-540	
R-411	N16-R-49247-116	
R-413	N16-R-50760-231	3350-128000-6535
R-414	N16-R-51174-231	3350-128000-7715
R-416	N16-R-50445-231	3350-128000-5551
R-417	N16-R-50418-231	3350-128000-5475
R-418	N16-R-50697-231	3350-128000-6295
R-419	N16-R-50823-231	3350-128000-6695
R-420	N16-R-50589-231	3350-128000-5875
R-424	N16-R-50715-231	3350-128000-6415
R-425	N16-R-66251-5991	3350-539000-4811
R-426	N16-R-66141-3006	3350-539000-4275
R-427	N16-R-66398-5948	3350-558000-4211
R-501	N16-R-49536-231	3350-128000-2695
R-502	N16-R-49428-231	3350-128000-2455
R-503	N16-R-49770-231	3350-128000-3515
R-504	N16-R-49428-231	3350-128000-2455
R-505	N16-R-49536-231	3350-128000-2695
R-506	N16-R-49770-231	3350-128000-3515
R-507	N16-R-49428-231	3350-128000-2455
R-508	N16-R-49536-231	3350-128000-2695
R-509	N16-R-49770-231	3350-128000-3515
R-510	N16-R-49428-231	3350-128000-2455

REF. DESIG.	STANDARD NAVY	AIR FORCE	REF. DESIG.	STANDARD NAVY	AIR FORCE
R-511	N16-R-49536-231	3350-128000-2695	R-559		
R-512	N16-R-49770-231	3350-128000-3515	R-560		
R-513	N16-R-49428-231	3350-128000-2455	R-601	N16-R-49770-231	3350-128000-3515
R-514	N16-R-49536-231	3350-128000-2695	R-701		
R-515	N16-R-49770-231	3350-128000-3515	R-702		3350-128000-3515
R-517	N16-R-50445-231	3350-128000-5551	R-801	N16-R-49463-811	3350-098000-1931
R-518	N16-R-50634-231	3350-128000-5955	R-802	N16-R-50741-811	3350-098000-5851
R-519	N16-R-50715-231	3350-128000-6415	R-803	N16-R-49651-438	3350-098000-2551
R-520	16-R-73192-1244		R-804	N16-R-90493-8605	3350-844500-3456
R-521	16-R-73192-1244		R-805	N16-R-50129-811	3350-098000-3931
R-522	N16-R-50634-231	3350-128000-5955	R-806	N16-R-50821-431	3350-098000-6191
R-523	16-R-73196-9811		R-807	16-R-72801-2417	
R-524	16-R-73192-1244		R-808	16-R-73261-2488	
R-525	16-R-73192-1244		R-809	N16-R-50632-431	3350-098000-5451
R-526	N16-R-66508-2661	3350-577000-2945	R-810	N16-R-49660-431	3350-098000-2591
R-527		3300-385315270	R-811	N16-R-49939-431	3350-098000-3411
R-528	N16-R-91340-5960	3350-851500-6521	R-812	16-R-73147-2553	
R-529	N16-R-91340-5960	3350-851500-6521	R-813	N16-R-50553-231	3350-128000-5795
R-530	16-R-72801-2489		R-814	N16-R-49464-231	3350-128000-2535
R-531	16-R-72801-2489		R-815	N16-R-49626-231	3350-128000-2935
R-532	16-R-72801-2489		R-816	N16-R-91291-4935	3350-844500-6311
R-533	16-R-62236-3230	3350-604000-6721	R-817	N16-R-50400-726	3350-146000-4797
R-534	16-R-62236-3230	3350-604000-6721	R-818	N16-R-50400-726	3350-146000-4797
R-536	N16-R-62159-8295	3350-591000-3471	R-819	N16-R-50373-726	3350-146000-4117
R-537	N16-R-49922-811	3350-128000-3835	R-820	N16-R-49464-231	3350-128000-2535
R-538	16-R-61779-9556	3350-604000-2853	R-821	N16-R-50337-231	3350-128000-4557
R-539	16-R-61779-9556	3350-604000-2853	R-822	N16-R-49500-231	3350-128000-2615
R-540	16-R-90215-4785	3350-901500-1921	R-823	N16-R-49939-751	3350-128000-3915
R-541	16-R-90215-4785	3350-901500-1921	R-824	N16-R-50335-751	3350-128000-5155
R-542	16-R-90215-4785	3350-901500-1921	R-825	N16-R-50418-231	3350-128000-5475
R-546	16-R-61506-1175	3350-604000-2128	R-826	N16-R-50371-751	3350-128000-5315
R-547	16-R-61506-1175	3350-604000-2128	R-827	N16-R-50236-431	3350-098000-4311
R-548	16-R-61506-1175	3350-604000-2128	R-828	N16-R-49428-231	3350-128000-2455
R-549	16-R-61506-1175	3350-604000-2128	R-829	N16-R-50237-811	3350-098000-4311
R-550	16-R-61506-1175	3350-604000-2128	R-830		
R-551	16-R-61506-1175	3350-604000-2128	R-831	N16-R-50040-726	3350-146000-3739
R-552	16-R-61580-9575	3350-599000-1988	R-832	16-R-72802-8344	
R-553	N16-R-49536-231	3350-128000-2695	R-833	N16-R-49993-431	3350-146000-3611
R-554	N16-R-49428-231	3350-128000-2455	R-834	16-R-73010-9084	
R-555	N16-R-49770-231	3350-128000-3515	R-835	N16-R-65935-3611	3350-505000-4541
R-556	16-R-90327-9913	3350-844500-1715	R-836	N16-R-50128-431	3350-098000-3971
R-557	16-R-64973-3853	3300-385063020	R-837	N16-R-49939-431	3350-098000-3411
R-558	16-R-65756-6926	3350-595750-3151	R-838	N16-R-73166-7872	3350-383600-3415

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
R-839	N16-R-90493-8605	3350-844500-3456
R-840	16-R-73176-9171	
R-841	16-R-73176-9171	
R-842	N16-R-49660-431	3350-098000-2591
R-843	N16-R-50281-431	3350-098000-4391
R-844	N16-R-50281-431	3350-098000-4391
R-845	N16-R-50308-431	3350-098000-4471
R-846	N16-R-91291-4935	3350-844500-6311
R-847	N16-R-50371-431	3350-098000-4711
R-848	N16-R-50371-431	3350-098000-4711
R-849	16-R-73122-4536	
R-850		
R-851	16-R-73122-4536	
R-852	N16-R-50479-431	3350-098000-5131
R-853	N16-R-50371-431	3350-098000-4711
R-854		
R-855		
R-856		
R-857		
R-858	N16-R-91291-4935	3350-844500-6311
R-859	N16-R-50443-431	3350-098000-4951
R-860	N16-R-50821-431	3350-098000-6191
R-861	16-R-73122-4536	
R-862	16-R-50146-438	
R-863	N16-R-49237-751	3350-128000-1715
R-863A	N16-R-49237-751	3350-128000-1715
R-864	N16-R-50283-231	3350-128000-4895
R-865	N16-R-50652-231	3350-128000-6135
R-866	N16-R-50652-231	3350-128000-6135
R-867	N16-R-50633-811	3350-098000-5451
R-868	N16-R-88007-8876	3350-759000-4724
R-869	N16-R-91031-1140	3350-849500-5031
R-870	N16-R-50823-231	3350-128000-6695
R-871	N16-R-50677-751	3350-128000-6215
R-872	N16-R-50130-231	3350-128000-4575
R-873	N16-R-50634-231	3350-128000-5955
R-874	N16-R-51021-231	3350-128000-7275
R-875	N16-R-50679-231	3350-128000-6215
R-876	N16-R-49581-231	3350-128000-2775
R-877	N16-R-50400-231	3350-128000-5395
R-878	N16-R-50373-231	3350-128000-4717
R-879	N16-R-50013-231	3350-128000-4255
R-880	N16-R-50373-231	3350-128000-4717
R-881	N16-R-50517-231	3350-128000-7515
R-882	N16-R-50517-231	3350-128000-7515
R-883	N16-R-50283-231	3350-128000-4895
R-884	N16-R-50679-231	3350-128000-6215
R-885	16-R-90493-8605	3350-844500-3457
R-886	N16-R-50481-231	
R-887	N16-R-50974-431	3350-098000-6511
R-888	N16-R-50760-231	3350-128000-6535
R-889	N16-R-50373-231	3350-128000-4717
R-890	N16-R-91291-4955	3350-844500-4814
R-891	16-R-49921-431	3350-098000-3331
R-892	N16-R-50588-811	
R-893	N16-R-50821-431	
R-894	N16-R-50588-811	3350-098000-5371
R-895	N16-R-50480-811	3350-098000-5131
R-896	N16-R-50371-431	3350-098000-4711
R-897	N16-R-50130-231	3350-128000-4575
R-898	N16-R-49941-231	3350-128000-3915
R-899	N16-R-91291-4935	3350-844500-6311
R-902	16-R-72986-4220	
R-903	N16-R-50480-811	3350-098000-5131
R-904	N16-R-49580-811	3350-098000-2271
R-905		
R-906	N16-R-50130-231	3350-128000-4575
R-907	N16-R-50418-231	3350-128000-5475
R-908	N16-R-50975-811	3350-098000-6511
R-909	N16-R-49626-231	3350-128000-2935
R-910	16-R-72802-8355	
R-911		
R-912		
R-914	N16-R-50066-811	3350-098000-3811
R-915	N16-R-66303-4662	3350-537000-3867
R-1001	N16-R-66141-3006	3350-539000-4275
R-1002	N16-R-66141-3006	3350-539000-4275
R-1003	N16-R-66141-3006	3350-539000-4275
R-1007	N16-R-49239-231	3350-128000-1715
R-1008	N16-R-49239-231	3350-128000-1715
R-1009	N16-R-49239-231	3350-128000-1715
R-1010	N16-R-49769-811	3350-098000-2911
R-1011	N16-R-49769-811	3350-098000-2911
R-1012	N16-R-49769-811	3350-098000-2911
R-1013		3350-146000-5437
R-1014	N16-R-50418-231	3350-128000-5475

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
R-1015	N16-R-50822-811	3350-098000-6191
R-1016	16-R-73196-9811	
R-1017	N16-R-91340-5960	3350-851500-6521
R-1018	16-R-73147-6789	
R-1019	N16-R-49769-811	3350-098000-2911
R-1020	N16-R-50822-811	3350-098000-6191
R-1021		3350-146000-5437
R-1022	N16-R-50418-231	3350-128000-5475
R-1023	N16-R-73177-2239	
R-1024	N16-R-91340-5960	3350-851500-6521
R-1025	16-R-73147-6789	
R-1026	N16-R-68297-7244	3350-492000-1483
R-1027	N16-R-89793-9960	
R-1028	N16-R-85001-9085	3350-061500-4195
R-1029	N16-R-85001-9085	3350-061500-4195
R-1030	N16-R-85001-9085	3350-061500-4195
R-1031	N16-R-85001-9085	3350-061500-4195
R-1101	N16-R-49444-751	3350-128000-2495
R-1102	N16-R-50283-231	3350-128000-4895
R-1103	N16-R-50282-811	3350-098000-4391
R-1104	N16-R-50589-231	3350-128000-5875
R-1105	N16-R-49941-231	3350-128000-3915
R-1106	N16-R-49428-726	3350-146000-1857
R-1107	N16-R-50373-231	3350-128000-5315
R-1108	16-R-49904-124	3350-146000-3297
R-1109	16-R-73147-2553	
R-1110	N16-R-50373-231	3350-128000-5315
R-1111	16-R-79947-2365	
R-1112	N16-R-49941-231	3350-128000-3915
R-1113	N16-R-49689-726	3350-146000-2677
R-1114		
R-1115		
R-1116		
R-1117		
R-1118	16-R-79947-2365	
R-1119	N16-R-50337-231	3350-128000-4557
R-1120	N16-R-49428-726	3350-146000-1857
R-1121	N16-R-49697-346	3350-146000-2717
R-1122	N16-R-49770-231	3350-128000-3515
R-1123	N16-R-50373-231	3350-128000-5315
R-1124	N16-R-50373-231	3350-128000-5315
R-1125	N16-R-50373-231	3350-128000-5315
R-1126	16-R-79830-7974	3350-447000-1358
R-1127	16-R-79830-7974	3350-447000-1358
R-1128	N16-R-49994-138	3350-146000-3617
R-1129	N16-R-49581-726	3350-146000-2277
R-1130	N16-R-49428-726	3350-146000-1857
R-1131	N16-R-49428-726	3350-146000-1857
R-1132	N16-R-49239-231	3350-128000-1715
R-1133	N16-R-49239-231	3350-128000-1715
R-1134	N16-R-49239-231	3350-128000-1715
R-1135	N16-R-49239-231	3350-128000-1715
R-1136	N16-R-49626-726	3350-146000-2437
R-1139	N16-R-65975-3731	3350-539000-5325
R-1140	N16-R-50697-726	3350-146000-5697
R-1141	N16-R-50418-231	3350-128000-5475
R-1142	N16-R-49770-231	3350-128000-3515
R-1143	N16-R-49770-231	3350-128000-3515
R-1144	N16-R-50823-231	3350-128000-6695
R-1145	16-R-73196-9811	
R-1146	N16-R-91340-5960	3350-851500-6521
R-1147	16-R-73147-6789	
R-1148	16-R-73097-8419	
R-1149	16-R-72993-7940	
R-1150	16-R-72993-7940	
R-1151	16-R-72993-7940	
R-1152	16-R-72993-7940	
R-1153	16-R-72993-7940	
R-1154	16-R-72993-7940	
R-1155	16-R-72993-7940	
R-1156	16-R-72993-7940	
R-1157	16-R-72993-7940	
R-1158	16-R-72993-7940	
R-1159	N16-R-49239-231	3350-128000-1715
R-1160	N16-R-49239-231	3350-128000-1715
R-1161		
R-1162	N16-R-49697-346	3350-146000-2717
R-1163	N16-R-49770-231	3350-128000-3515
R-1164	N16-R-49581-726	3350-146000-2277
R-1165	N16-R-49626-726	3350-146000-2437
R-1166	16-R-45544-2480	
R-1167	16-R-45544-2480	
R-1182	N16-R-50040-231	3350-128000-4335
R-1183	N16-R-49428-726	3350-146000-1857
R-1201	N16-R-50651-811	3350-098000-5531
R-1202	N16-R-50651-811	3350-098000-5531

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
R-1203	N16-R-50417-811	3350-447000-1967
R-1204	N16-R-50651-811	3350-098000-5531
R-1205	N16-R-50651-811	3350-098000-5531
R-1206	N16-R-50166-231	3350-128000-4655
R-1207	N16-R-50697-726	3350-146000-5697
R-1208	N16-R-50715-726	3350-146000-5777
R-1209	N16-R-50517-231	3350-128000-7515
R-1210	N16-R-50742-726	3350-146000-5857
R-1211	N16-R-50993-811	3350-098000-6591
R-1212	N16-R-50715-726	3350-146000-5777
R-1213	N16-R-50679-726	3350-146000-5617
R-1214	N16-R-50742-726	3350-146000-5857
R-1215	N16-R-50858-811	3350-098000-6271
R-1216	N16-R-50310-231	3350-128000-4975
R-1217	N16-R-50517-231	3350-128000-6415
R-1218	N16-R-50858-811	3350-098000-6271
R-1219	N16-R-50976-231	3350-128000-7115
R-1220	N16-R-50373-726	3350-146000-4117
R-1221	N16-R-50373-726	3350-146000-4117
R-1222	N16-R-50040-726	3350-146000-3739
R-1223	N16-R-50040-726	3350-146000-3739
R-1224	N16-R-50040-726	3350-146000-3739
R-1225	N16-R-50040-726	3350-146000-3739
R-1226	N16-R-49994-138	3350-146000-3617
R-1227	N16-R-49994-138	3350-146000-3617
R-1301	16-R-45555-2510	
R-1302	16-R-45555-2510	
R-1303	16-R-49428-290	
R-1304	N16-R-90754-3621	3350-844500-3851
R-1305 thru R-1315	N16-R-49428-231	3350-128000-2455
R-1316	16-R-65385-3706	3350-558000-2185
R-1317 thru R-1321	N16-R-49428-231	3350-128000-2455
R-1323		
R-1324		
R-1386	N16-R-49464-231	3350-128000-2535
R-1401	N16-R-49464-231	3350-128000-2535
R-1402	N16-R-49464-231	3350-128000-2535
R-1601		
R-1602		
R-1603		
S-101	17-S-70412-4406	3360-395852800
S-102	N17-S-73959-1025	3360-395853615
S-104	N17-S-69074-4589	
S-301		
S-302		
S-303	17-K-45899-1001	
S-401	17-S-70412-4406	3360-395852800
S-402	N17-S-72018-7719	3360-395852810
S-403	17-K-45899-1001	
S-404		
S-501	17-S-59931-7384	
S-502	N17-S-72828-2605	3360-395853600
S-503		3360-395322350
S-504		3360-395322350
S-505	N17-S-70777-8651	3360-395852806
S-701 thru S-710	17-S-60128-8855	
S-711		
S-712		
S-801	N17-S-72828-2605	3360-395853600
S-802	N17-S-73959-1025	3360-395853615
S-803	17-S-65063-8213	
S-804	17-S-65063-8226	
S-805	17-S-70412-4406	3360-395852800
S-806	17-S-70013-1625	
S-808		
S-901	17-S-70013-1620	
S-902		
S-903	N17-S-73959-1025	3360-395853615
S-904	17-S-91689-1007	
S-1001	N17-S-72828-2605	3360-395853600
S-1002	17-S-61164-5209	
S-1101		
S-1102	17-S-61497-1474	
S-1103		
S-1104	17-S-91689-1002	
S-1105	17-S-69571-2648	
S-1106		
S-1301	17-S-64721-2025	
S-1302	17-S-91790-5845	
S-1303	17-S-91691-1024	

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
S-1304 thru S-1313	17-S-64656-6239	
S-1314 thru S-1323	17-S-60523-1268	
S-1324		
S-1325		
S-1326	17-S-70024-9087	
S-1401	17-S-91790-5845	
S-1402	17-S-91790-5845	
S-1403		
S-1404 thru S-1413	17-S-60520-5156	
S-1414		
S-1415		
S-1501	17-S-56231-3541	
S-1502	17-S-57355-4950	
S-1503		
S-1601	17-S-57355-4950	
S-1602	17-S-57355-4950	
S-1701	17-S-56231-3541	
S-1702	17-S-57355-4950	
T-106	N17-T-81716-1167	
T-107	N17-T-81716-1167	
T-108	17-T-67710-4267	
T-109	17-T-67710-4267	
T-111	N17-T-81731-1383	
T-113	N17-T-81320-1103	
T-301	17-T-61523-7001	
T-302	17-T-65928-3250	
T-303		
T-304		
T-305	17-T-72734-8316	
T-306	17-T-72734-8322	
T-401	17-T-61523-7001	
T-402		
T-403	17-T-73589-5053	
T-501	17-T-72758-1659	
T-502	17-T-72758-1659	
T-504	17-T-72733-6140	
T-505	17-T-78136-2201	
T-506	17-T-76101-2432	
T-507	17-T-72694-1942	
T-508	17-T-72694-1937	
T-509		
T-510		
T-801		
T-802		
T-803		
T-901	17-T-72734-8317	
T-902		
T-1001	17-T-72740-7911	
T-1002	17-T-76093-1817	
T-1101	17-T-72734-8315	
T-1102	17-T-72734-8319	
T-1301	17-T-72734-8322	
T-1501		
T-1603		
TB-111	N17-B-77936-5250	8880-501021-1955
TB-112	N17-B-77636-3914	8880-500421-1655
TB-402	N17-B-77534-5199	8880-502221-3955
TB-403	N17-B-78140-7751	8880-502221-3255
TB-501	17-B-77802-3251	
TB-502	17-B-78091-5501	
TB-507	N17-B-77844-7160	8880-500821-4415
TB-508	N17-B-78103-8425	
TB-509	N17-B-78103-8425	
TB-510	N17-B-78103-8425	
TB-518	N17-B-78103-8425	
TB-813	N17-B-77585-4531	8880-500321-1755
TB-814	N17-B-77688-4265	8880-500521-6175
TB-815	N17-B-77636-3914	8880-500421-1655
TB-1401	N17-B-78063-8343	8880-501521-2255
TB-1402	N17-B-77687-3401	8880-500521-2355
TB-1501	N17-B-78140-7751	8880-502221-3255
TB-1502	N17-B-78140-7751	8880-502221-3255
TB-1503	N17-B-78140-7751	8880-502221-3255
TB-1504	N17-B-78140-7751	8880-502221-3255
TB-1701	N17-B-78140-7751	8880-502221-3255
TB-1702	N17-B-78140-7751	8880-502221-3255
TB-1703	N17-B-77741-8835	8880-500691-3655
TB-1704	N17-B-77688-4094	8880-500521-6175
V-101	N16-T-75670	3370-316000-5675
V-102	N16-T-75670	3370-316000-5675
V-103	N16-T-75670	3370-316000-5675

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
V-104	N16-T-75654	
V-105	N16-T-75654	
V-107	N16-T-75654	
V-108	N16-T-75750	3370-283000-5755
V-109	N16-T-75654	
V-110	N16-T-75750	3370-283000-5755
V-111	N16-T-75654	
V-112	N16-T-75750	3370-283000-5755
V-113	N16-T-75654	
V-114	N16-T-75686	
V-115	N16-T-75670	3370-316000-5675
V-116	N16-T-75670	3370-316000-5675
V-117	N16-T-75670	3370-316000-5675
V-118	N16-T-75654	
V-119	N16-T-75686	
V-120	N16-T-75686	
V-121	N16-T-75686	
V-122	N16-T-75686	
V-123	N16-T-75670	3370-316000-5675
V-124	N16-T-75670	3370-316000-5675
V-125	N16-T-75726	3370-259000-5785
V-126	N16-T-75726	3370-259000-5785
V-127	N16-T-75750	3370-283000-5755
V-128	N16-T-75749	3370-286000-5755
V-129	N16-T-75654	
V-301	N16-T-56677-40	3370-316000-6485
V-302	N16-T-56220	3370-316000-6195
V-303	N16-T-56220	3370-316000-6195
V-304	N16-T-56667-50	3370-286000-6525
V-305	N16-T-56860	3370-304000-6225
V-306	N16-T-56684-30	3370-316000-6535
V-307	N16-T-56684-30	3370-316000-6535
V-308	N16-T-56684-30	3370-316000-6535
V-309	N16-T-54075	3370-445000-4115
V-310	N16-T-54075	3370-445000-4115
V-401	N16-T-56350	3370-316000-6295
V-402	N16-T-56350	3370-316000-6295
V-403	N16-T-55446-5	
V-404	N16-T-56458	3370-298000-6275
V-405	N16-T-56660	3370-286000-6465
V-406	N16-T-53030	3370-331000-1645
V-407	N16-T-53030	3370-331000-1645
V-518	N16-T-68070	3370-427000-8185
V-519	N16-T-68070	3370-427000-8185
V-520	N16-T-68070	3370-427000-8185
V-521	N16-T-68070	3370-427000-8185
V-522	N16-T-68070	3370-427000-8185
V-523	N16-T-68070	3370-427000-8185
V-524	N16-T-56203-53	3370-356000-6289
V-525	N16-T-52001-3	
V-526	N16-T-52001-3	
V-527	N16-T-52001-3	
V-528	N16-T-52001-3	
V-529	N16-T-52001-3	
V-530	N16-T-53228	3370-433000-3155
V-531	N16-T-53228	3370-433000-3155
V-532	N16-T-53228	3370-433000-3155
V-533	N16-T-53228	3370-433000-3155
V-534	N16-T-53228	3370-433000-3155
V-535	N16-T-53228	3370-433000-3155
V-536	N16-T-54232	3370-433000-4185
V-537	N16-T-54232	3370-433000-4185
V-538	N16-T-54232	3370-433000-4185
V-539	N16-T-54232	
V-540	N16-T-54232	3370-433000-4185
V-541	N16-T-54232	3370-433000-4185
V-801	N16-T-75750	3370-283000-5755
V-802	N16-T-75750	3370-283000-5755
V-803	N16-T-75749	3370-286000-5755
V-804	N16-T-75686	3370-298000-4685
V-805	N16-T-75726	3370-259000-5785
V-806	N16-T-75670	3370-316000-5675
V-807	N16-T-56203-53	3370-356000-6289
V-808	N16-T-56203-53	3370-356000-6289
V-809	N16-T-56203-53	3370-356000-6289
V-810	N16-T-56203-53	3370-356000-6289
V-811	N16-T-75814	3370-265000-5816
V-812	N16-T-56360	3370-316000-6345
V-901	N16-T-75654	
V-902	N16-T-56177	3370-298000-6125
V-903	N16-T-53030	3370-331000-1645
V-904	N16-T-53030	3370-331000-1645
V-1001	N16-T-55446-5	
V-1002	N16-T-55446-5	
V-1003	N16-T-56840-50	3370-304000-6175
V-1004	16-T-52001-0008	
V-1005	N16-T-56202	3370-316000-6125

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
V-1006	N16-T-56202	3370-316000-6125
V-1007	N16-T-56202	3370-316000-6125
V-1008	N16-T-56203-53	3370-356000-6289
V-1009	N16-T-56458	
V-1010	N16-T-56203-53	3370-356000-6289
V-1101	N16-T-56758	3370-298000-6375
V-1102	N16-T-56758	
V-1103	N16-T-68070	3370-427000-8185
V-1104	N16-T-54048	
V-1105	N16-T-54048	
V-1106	N16-T-56202	3370-316000-6125
V-1107	N16-T-56660	3370-286000-6465
V-1201	N16-T-75814	3370-265000-5816
V-1202	N16-T-75814	3370-265000-5816
V-1203	N16-T-75814	3370-265000-5816
V-1204	16-T-52001-0008	
V-1301	N16-T-54075	3370-445000-4115
V-1302	N16-T-54075	3370-445000-4115
W-1501		
W-1502		
W-1503		
W-1504		
W-1505		
W-1506		
W-1507		
W-1508		
W-1509		
W-1601		
W-1602		
W-1603		
W-1604		
W-1605		
W-1606		
W-1607		
W-1608		
W-1701		
W-1901	17-C-48371-6633	
W-1902	17-C-48446-6337	
W-1903	17-C-48396-7335	
W-1904	17-C-48446-6337	
W-1905	17-C-48464-6020	
W-1906	17-C-48465-8505	
W-1907	17-C-48468-6097	
W-1908	17-C-48470-1250	
W-1909	17-C-48126-2198	
W-1910	17-C-48126-2991	
W-1911		
XF-101	N17-F-74267-5701	8870-584000-555
XF-102	N17-F-74267-5701	8870-584000-555
XF-301	N17-F-74267-5701	8870-584000-555
XF-302	N17-F-74267-5701	8870-584000-555
XF-401	N17-F-74267-5701	8870-584000-555
XF-501	N17-F-74267-5701	8870-584000-555
XF-502	N17-F-74267-5701	8870-584000-555
XF-503	N17-F-74267-5701	8870-584000-555
XF-504	N17-F-74267-5701	8870-584000-555
XF-505	N17-F-74267-5701	8870-584000-555
XF-506	N17-F-74267-5701	8870-584000-555
XF-507	N17-F-74267-5701	8870-584000-555
XF-508	N17-F-74267-5701	8870-584000-555
XF-509	N17-F-74267-5701	8870-584000-555
XF-510	N17-F-74267-5701	8870-584000-555
XF-511	N17-F-74267-5701	8870-584000-555
XF-512	N17-F-74267-5701	8870-584000-555
XF-513	N17-F-74267-5701	8870-584000-555
XF-514	N17-F-74267-5701	8870-584000-555
XF-515	N17-F-74267-5701	8870-584000-555
XF-516	N17-F-74267-5701	8870-584000-555
XF-801	N17-F-74267-5701	8870-584000-555
XF-802	N17-F-74267-5701	8870-584000-555
XF-901	N17-F-74267-5701	8870-584000-555
XF-1001	N17-F-74267-5701	8870-584000-555
XF-1002	N17-F-74267-5701	8870-584000-555
XF-1101	N17-F-74267-5701	8870-584000-555
XF-1102	N17-F-74267-5701	8870-584000-555
XF-1301	N17-F-74267-5701	8870-584000-555
XI-101		
XI-102		
XI-103		
XI-104		
XI-105		
XI-106		
XI-401		
XI-501	N17-L-76670-4107	7770-539112
XI-502	N17-L-76670-4107	7770-539112
XI-503	N17-L-76670-4107	7770-539112

TABLE 8-3. STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
XI-504	N17-L-76670-4107	7770-539112
XI-801		
XI-802		
XI-803		
XI-901		
XI-902		
XI-1001		
XR-1028	N16-S-63515-4151	8850-889946
XR-1029	N16-S-63515-4151	8850-889946
XR-1030	N16-S-63515-4151	8850-889946
XR-1031	N16-S-63515-4151	8850-889946
XV-101	N16-S-64063-6713	8850-896590
XV-102	N16-S-64063-6713	8850-896590
XV-103	N16-S-64063-6713	8850-896590
XV-104	N16-S-62603-6702	8850-882880
XV-105	N16-S-62603-6702	8850-882880
XV-107	N16-S-62603-6702	8850-882880
XV-108	N16-S-62603-6702	8850-882880
XV-109	N16-S-62603-6702	8850-882880
XV-110	N16-S-62603-6702	8850-882880
XV-111	N16-S-62603-6702	8850-882880
XV-112	N16-S-62603-6702	8850-882880
XV-113	N16-S-62603-6702	8850-882880
XV-114	N16-S-64063-6713	8850-896590
XV-115	N16-S-64063-6713	8850-896590
XV-116	N16-S-64063-6713	8850-896590
XV-117	N16-S-64063-6713	8850-896590
XV-118	N16-S-62603-6702	8850-882880
XV-119	N16-S-64063-6713	8850-896590
XV-120	N16-S-64063-6713	8850-896590
XV-121	N16-S-64063-6713	8850-896590
XV-122	N16-S-64063-6713	8850-896590
XV-123	N16-S-64063-6713	8850-896590
XV-124	N16-S-64063-6713	8850-896590
XV-125	N16-S-62603-6702	8850-882880
XV-126	N16-S-62603-6702	8850-882880
XV-127	N16-S-62603-6702	8850-882880
XV-128	N16-S-62603-6702	8850-882880
XV-129	N16-S-62603-6702	8850-882880
XV-301	N16-S-63515-4151	8850-889946
XV-302	N16-S-63515-4151	8850-889946
XV-303	N16-S-63515-4151	8850-889946
XV-304	N16-S-63515-4151	8850-889946
XV-305	N16-S-63515-4151	8850-889946
XV-306	N16-S-63515-4151	8850-889946
XV-307	N16-S-63515-4151	8850-889946
XV-308	N16-S-63515-4151	8850-889946
XV-309	N16-S-61912-9110	
XV-310	N16-S-61912-9110	
XV-401	N16-S-63515-4151	8850-889946
XV-402	N16-S-63515-4151	8850-889946
XV-403	N16-S-63515-4151	8850-889946
XV-404	N16-S-63515-4151	8850-889946
XV-405	N16-S-63515-4151	8850-889946
XV-406	N16-S-63515-4151	8850-889946
XV-407	N16-S-63515-4151	8850-889946
XV-518	N16-S-61719-4639	
XV-519	N16-S-61719-4639	
XV-520	N16-S-61719-4639	
XV-521	N16-S-61719-4639	
XV-522	N16-S-61719-4639	
XV-523	N16-S-61719-4639	
XV-524	N16-S-62603-6702	8850-882880
XV-525	N16-S-62603-6702	8850-882880
XV-526	N16-S-62603-6702	8850-882880
XV-527	N16-S-62603-6702	8850-882880
XV-528	N16-S-62603-6702	8850-882880
XV-529	N16-S-62603-6702	8850-882880
XV-530	N16-S-60855-3001	8850-874421
XV-531	N16-S-60855-3001	8850-874421
XV-532	N16-S-60855-3001	8850-874421
XV-533	N16-S-60855-3001	8850-874421
XV-534	N16-S-60855-3001	8850-874421
XV-535	N16-S-60855-3001	8850-874421
XV-536	N16-S-60935-7481	
XV-537	N16-S-60935-7481	
XV-538	N16-S-60935-7481	
XV-539	N16-S-60935-7481	
XV-540	N16-S-60935-7481	
XV-541	N16-S-60935-7481	
XV-801	N16-S-62603-6702	8850-882880
XV-802	N16-S-62603-6702	8850-882880
XV-803	N16-S-62603-6702	8850-882880
XV-804	N16-S-64063-6713	8850-896590
XV-805	N16-S-62603-6702	8850-882880
XV-806	N16-S-62603-6702	8850-882880

TABLE 8-3 STOCK NUMBER IDENTIFICATION (Cont'd)

REF. DESIG.	STANDARD NAVY	AIR FORCE
XV-807	N16-S-62603-6702	8850-882880
XV-808		
XV-809		
XV-810		
XV-811	N16-S-64063-6713	8850-896590
XV-812	N16-S-62603-6702	8850-882880
XV-901	N16-S-62603-6702	8850-882880
XV-902	N16-S-63515-4151	8850-889946
XV-903	N16-S-63515-4151	8850-889946
XV-904	N16-S-63515-4151	8850-889946
XV-1001	N16-S-63515-4151	8850-889946
XV-1002	N16-S-63515-4151	8850-889946
XV-1003	N16-S-62603-6702	8850-882880
XV-1004	N16-S-62603-6702	8850-882880
XV-1005	N16-S-63515-4151	8850-889946
XV-1006	N16-S-63515-4151	8850-889946
XV-1007	N16-S-63515-4151	8850-889946
XV-1008	N16-S-62603-6702	8850-882880
XV-1009	N16-S-63515-4151	8850-889946
XV-1010	N16-S-62603-6702	8850-882880
XV-1101	N16-S-63515-4151	8850-889946
XV-1102	N16-S-63515-4151	8850-889946
XV-1103	N16-S-61719-4639	
XV-1104	N16-S-62822-7171	8850-885919
XV-1105	N16-S-62822-7171	8850-885919
XV-1106	N16-S-63515-4151	8850-889946
XV-1107	N16-S-63515-4151	8850-889946
XV-1201	N16-S-64063-6713	8850-896590
XV-1202	N16-S-64063-6713	8850-896590
XV-1203	N16-S-64063-6713	8850-896590
XV-1204	N16-S-62603-6702	8850-882880
XV-1301	N16-S-61912-9110	
XV-1302	N16-S-61912-9110	
XY-801	16-S-54287-5051	8850-866276
XY-901	16-S-54287-5051	8850-866276
XY-902	16-S-54287-5051	8850-866276
XY-903	16-S-54287-5051	8850-866276
XY-904	16-S-54287-5051	8850-866276
XY-905	16-S-54287-5051	8850-866276
XY-906	16-S-54287-5051	8850-866276
XY-907	16-S-54287-5051	8850-866276
XY-908	16-S-54287-5051	8850-866276
XY-909	16-S-54287-5051	8850-866276
XY-910	16-S-54287-5051	8850-866276
Y-101	N16-C-96177-3001	
Y-801	N16-C-96249-9766	
Y-901	N17-T-81749-1011	
thru		
Y-910		
Z-101	N16-O-55023-4765	1760-213575938
Z-102	N16-O-55036-7755	1760-213575939
Z-103	N16-F-44278-4358	
Z-104	N16-C-76635-4341	
Z-105		
Z-106		
Z-107		
Z-112	17-T-67461-3985	
Z-801		
Z-802		
Z-803		
Z-804	16-N-48901-1046	

TABLE 8-4. LIST OF MANUFACTURERS

ABBREVIATIONS	PREFIX	NAME	ADDRESS
	CADI	James Knight	Sandwich, Ill.
	CAE	Cutler Hammer, Inc.	Milwaukee, Wis.
	CAFQ	Radio Receptor, Inc.	New York, N. Y.
	CAGK	Amperite Company, Inc.	New York, N. Y.
	CAI	Aladdin Radio Industries, Inc.	Chicago, Ill.
	CAIB	Electric Indicator Co.	Stamford, Conn.
	CAMQ	Cambridge Thermionic Corp.	Cambridge, Mass.
	CAN	Sangamo Electric Co.	Springfield, Ill.
	CAQ	Robins & Myers, Inc.	Springfield, Ill.
	CAQN	Friedman Co.	New York, N. Y.
	CAS	American Lava Corp.	Chattanooga, Tenn.
	CAU	Automatic Electric Co.	Chicago, Ill.
	CAUP	Kurz-Kasch, Inc.	Dayton, Ohio
	CAUS	Monitor Controller Co.	Baltimore, Md.
	CAYZ	Dial Light Corp.	New York, N. Y.
	CAZG	Jennings Radio Mfg. Co.	San Jose, Calif.
	CBAM	SKF Industries	Philadelphia, Pa.
	CBCA	George Ulanet Co.	Newark, N. J.
	CBEN	Air-Maze Corp.	Cleveland, Ohio
	CBER	Phillips Control Corp.	Chicago, Ill.

TABLE 8-4. LIST OF MANUFACTURERS (Cont'd)

ABBREVIATIONS	PREFIX	NAME	ADDRESS
	CBH	Boston Gear Works	N. Quincy, Mass.
	CBIK	Broadway Electronics	Red Bank, N. J.
	CBK	Cardwell Allen D. Mfg. Co.	Plainville, Conn.
	CBSA	Ace Machine Corp.	College Point, N. Y.
	CBZ	Allen-Bradley Co.	Milwaukee, Wis.
	CBZG	Kulka Electrical Mfg. Co., Inc.	Mt. Vernon, N. Y.
	CCO	Carborundum Co.	Niagara Falls, N. Y.
	CDP	General Ceramics & Steatite Corp.	Keasby, N. J.
	CEB	Eby Hugh H.	Philadelphia, Pa.
	CEJ	Johnson E. F. Co.	Waseca, Minn.
	CER	Erie Resistor Corp.	Erie, Pa.
	CFA	Bussman Mfg. Co.	St. Louis, Mo.
	CFT	Federal Telephone & Radio Corp.	Clifton, N. J.
	CG	General Electric Co.	Schenectady, N. Y.
	CGM	General Motors	Detroit, Mich.
	CHC	Hammarlund Mfg. Co.,Inc.	New York, N. Y.
	CHD	Hardwick-Hindle Inc.	Newark, N. J.
	CHN	Heineman Circuit Breaker Co.	Trenton, N. J.
	CHP	Hayden Mfg. Co., Inc.	Forestville, Conn.
	CIM	Eitel-McCullough Co.	San Bruno, Calif.

TABLE 8-4. LIST OF MANUFACTURERS (Cont'd)

ABBREVIATIONS	PREFIX	NAME	ADDRESS
	CJA	Millen James Mfg. Co., Inc.	Malden, Mass.
	CJC	Jones Howard B.	Chicago, Ill.
	CKJ	Karp Metal Products Co., Inc.	Brooklyn, N. Y.
	CMA	Mallory P R Co., Inc.	Indianapolis, Ind.
	CMC	Clarostat Mfg. Co.	Brooklyn, N. Y.
	CMU	Micro-Switch Corp.	Freeport, Ill.
	CMY	Marion Electrical Inst. Co.	Manchester, N. H.
	CNA	National Co., Inc.	Malden, Mass.
	COB	Barber-Colman Co.	Rockford, Ill.
	COC	Oak Mfg. Co.	Chicago, Ill.
	COL	Collins Radio Co., Inc.	Cedar Rapids, Iowa
	CPD	Communication Products Co.	Jersey City, N. J.
	CSD	Struthers Dunn, Inc.	New York, N. Y.
	CSF	Sprague Electric Co.	N. Adams, Mass.
	CTC	Chicago Telephone Supply Co.	Elkhart, Ind.
	CVV	Wiegand Edwin L. Co.	Pittsburgh, Pa.
	ETR	Electra Mfg. Co.	Kansas City, Mo.
	HEM	Hartman Electrical Mfg. Co.	Mansfield, Ohio
	HGB	Heminway & Bartlett Mfg. Co.	New York, N. Y.
	MIN	Irvington Varnish & Insulator	Irvington, N. J.

TABLE 8-4. LIST OF MANUFACTURERS (Cont'd)

ABBREVIATIONS	PREFIX	NAME	ADDRESS
	RESP	Resistance Products Co.	Harrisburg, Pa.
	RLIC	Radell Corp.	Indianapolis, Ind.
	TOM	Thomas & Betts Co.	Elizabeth, N. J.
	TOR	Torrington Mfg. Co.	New York, N. Y.
	WIQ	Winchester Electronics, Inc.	Glenbrook, Conn.
		Bradley Labs Inc.	New Haven, Conn.
		Harry Davis Molding Co.	Chicago, Ill.
		Henry G. Dietz Co.	Long Island City, N. Y.
		Plastic Capacitors, Inc.	Chicago, Ill.
		Stephen Decatur	New York, N. Y.

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